SCHOOL LEADERS AND THE IMPLEMENTATION OF EDUCATION MANAGEMENT INFORMATION SYSTEM (EMIS) IN THE BAHAMAS: A case study of six principals

by

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I hereby declare that this thesis has not been submitted, either in the same or different form, to this or any other University for a degree.

Signature ……

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ABSTRACT

The tension between the leadership of technology and technology as a means of school improvement are still issues of debate. Researchers have argued that education management technology has yet to make a significant contribution to school improvement, while others have experienced small pockets of success. This study seeks to contribute to the debate by exploring the tension associated with the implementation of an education management information system (EMIS) in The Bahamas from the experiences of school leaders. More specifically, this thesis explores EMIS from the understanding of six principals in their schools and its contributions to their schools. This study develops a social constructivist view and relies on the case study approach.

Among the major findings of the study was that EMIS was often perceived by principals to be associated with conflict and the primary uses of the technology were for generating report cards, facilitating school administrative tasks and monitoring. Principals' expressed concern for the lack of support from senior management and the impact of using the technology on their role as leader. As conflicts hindered the implementation of EMIS, principals adopted a shared leadership approach.

This study offers pertinent information concerning the reasons why EMIS is underutilized and the important contributions of leadership to the successful implementation of the technology. Such information can be useful for understanding EMIS in education organizations.

Key words: EMIS, social constructivist, school leadership, The Bahamas, Bahamas education

DEDICATION

The writing of a dissertation is challenging, requires a tremendous amount of sacrifice and can be a lonely experience, yet it is obviously not possible without the personal and practical support of numerous people. I am immensely grateful to my number one fan and supporter, Barbara Patricia Mary Wilson Cash. Her constant support for her one and only son is a reservoir of encouragement and strength in my educational endeavours, without her this dissertation would have not been possible. I would like to thank my wife, Enoush Cash for her love, companionship, and belief in me.

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LIST OF ACRONYMS

AS	Activity system
AT	Activity theory
BGCSE	Bahamas General Certificate of Secondary Education
BJC	Bahamas Junior Certificate examination
CHAT	Cultural Historical Activity Theory
DoE	Department of Education
DoS	Department of Statics
EMIS	Education management information system
GLAT	Grade Level Assessment test
HCI	Human-computer interaction
ICT	Information and communication technology
IDB	Inter-American Development Bank
ITEM	Information technology education management
LMS	Learning management system
MoE	Ministry of Education
MIS	Management Information System Unit
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER 1: INTRODUCTION

Rapid technological changes have impacted on many aspects of professional life. The public service sector, such as education, is greatly impacted by the growing interest in innovative approaches for improving and developing the handling of student information. Emphasis on the use of technology as a way of improvement has been commonly accepted and major international funding and donor agencies are keen to support such investments. As a result, more and more countries are investing in education management information systems (EMIS). With such investments educational leaders are challenged with how to successfully implement such technology in the midst of daily work challenges and the complexity of change (MacKinnon and MacKinnon, 2010; Chitolie-Joseph, 2011; Bhatti and Adnan, 2013).

Although much research has been conducted on EMIS in various countries few have adopted a leadership focus. In Namibia, Voigts (1999) outlines the contribution of EMIS to the government's information cycle and the impact upon the school information handling procedures. Powell (2006) gives insight into EMIS in Ghana and Nigeria and suggests the need to re-think the assumptions associated with the technology. These studies, together with others, reveal a gap between leadership and EMIS (Wako, 2003; Cassidy, 2005; Van der Westhuizen and Van Vuuren, 2007; Komba and Nkumbi, 2008). This research aims to address this gap by building on interest generated through years of experience leading the implementation of EMIS into schools. The challenges and successes faced gave insight into the constructive nature of technological change. These insights, together with substantial reading and review of literature in the field, led to framing the research around EMIS as supported by leaders through collaborative participation of staff in activities related to school administration.

With growing excitement for innovative approaches to school improvement, decision makers were keen to move towards EMIS. Thus, it was important to adopt a leadership perspective and investigate from this view how EMIS is used, understood, supported/hindered, and how it contributed to the management of schools. To address these issues, data from six principals themselves are analysed alongside discussions from a literature review of EMIS and technology leadership. The key concern is to enhance understanding of the contributions of leadership to shaping the implementation of EMIS. Such a focus is pertinent given the resource invested in making the technology commonplace.

This research contributes to the debate on EMIS as it is experienced by principals in context. With the increased reliance on EMIS it is important to explore the leadership perspective to understand the viewpoint of those shaping the successes and/or failures with the technology.

1.1 Research Purpose

The government of The Bahamas launch of EMIS symbolizes the belief that the management of schools can readily be improved through the use of new technology. A perceived tension between the implementation of the new EMIS and the day-to-day leadership in schools prompted this research. There was concern that EMIS was introduced without due consideration as to: 1) the contextual dynamics within which the technology is implemented; 2) how the technology is to be implemented with regards to leadership; and 3) the impact of the technology on principals' professional practice'.

Given the focus of senior decision-makers on EMIS, it is increasingly important that research is carried out on some of the taken for granted assumptions with such initiatives. By studying EMIS from a leadership perspective, the aim is to gather information from the individuals who are at the heart of working with the technology. This study is crucial for a number of

reasons. Firstly, EMIS needs to be investigated with regard to leadership since it impacts the implementation of the technology in context. Such insight is important, particularly since new technology involves change. Secondly, there is a need to investigate the impact of EMIS on the leadership arrangements, particularly for understanding how the technology influences (or is influenced by) individual responsibilities. Finally, there is a need to understand the contributions of EMIS.

A review of the literature revealed a lack of research addressing the leadership dynamics of EMIS. This scarcity warrants investigation into leadership aspects of EMIS and, in particular, the contribution of such technology. Currently there still appears to be little empirical research addressing this. To hear the viewpoint of the leadership involved with the technology is of paramount importance.

The purpose of this study is to explore the understandings of school leaders and the implementation of EMIS in The Bahamas as experienced by six school principals and to explore their understanding of the contributions of the technology. This research purpose is two-fold. First, it develops from a need to understand EMIS from the view of school leaders involved first hand with the technology. Second, it aims to understand the contributions of EMIS to the school. To this end, the study privileges the voice of school principals since it is their experiences that bring focus to the issues this study seeks to explore.

This study has practical and theoretical implications. Practically, an in-depth understanding of EMIS in context allows reflection about the rationale used to support/hinder the implementation. The study of principals also provides information about the handling of school resources and the coordination of responsibilities. Theoretically, investigating the

leadership perspective of EMIS allows insight into the strategies used with technological change and the rationale associated with school improvement.

1.2 Research Rationale

The leadership focus on EMIS as a research topic is personally motivated. This is underpinned by personal experiences leading to the implementation of EMIS into public schools for The Bahamas government. In 2004 the researcher was recruited by the Department of Education (DoE) to take responsibility for the implementation of EMIS into the schools. Prior to the researcher's involvement, several schools were selected by officials at the DoE to implement EMIS. Training was provided by EMIS provider for individuals in the schools participating in the implementation. The individuals from the school were expected to use the lessons acquired from training to support their school's use of the technology.

EMIS was installed on a school server located in an administrator's office by the Management Information System unit (MIS) of the Ministry of Education (MoE), five computers were networked to support its use and pass codes given to a school administrator. After several years EMIS was not being used and the DoE was dissatisfied. In search for answers, the DoE questioned the school leaders who complained that there were too many barriers preventing their use of the technology and that there was a shortage of resource. Also, the training sessions provided were not sufficient for them to use the technology, and that the timing of the training relative to the installation of infrastructure was too distant for them to remember the lessons. At this point the DoE had invested significant funds into the project and were not willing to let this investment be wasted and so they recruited the researcher. My task was to provide leadership to ensure that DoE investment in EMIS was not wasted. This

included issues related to the technological infrastructure, training of principals, administrators and teachers, and reporting relevant information to senior management at the DoE. For the researcher, fulfilling the organizational responsibility was a priority, and thus, my understanding of 'success' with EMIS was ensuring that the technology was installed into schools and operating to the point that enabled school leaders to produce a report.

As my involvement with the programme continued, the number of sites where the technology was installed increased from seven to fifteen. Leaders in some schools were optimistic about the technology while others were apprehensive. The impression given by school leaders was that the schools were not fully realising the general assumptions made about the new technological innovation. For some leaders in the school the technology seemed to be more of a hindrance than a positive contribution to the schools. The response of principals and their involvement with EMIS offered points of interest, especially since most of the work with the technology required their input. Although the number of schools involved with EMIS increased, the implementation varied amongst schools. As an insider, it seemed that there were challenges to the successful implementation of EMIS. Questions were asked about what caused the same technology to work better in some schools, what challenges existed in the local context and how did principals lead their staff through these challenges, what aspects of the technology supported or hindered existing practices, and how did the technology mesh with the leadership in the school. In order to address these concerns, this study was undertaken.

1.3 Research questions

The researcher's experiences as an insider, together with substantial reading and a review of the literature, led to framing the research study to explore EMIS from the leadership perspective.

The overarching research question of this study is 'What is the leadership understanding of the implementation and contributions of EMIS in The Bahamas?' This question warrants investigation into principals' experiences and the implementation of EMIS. Thus, within this overarching question, the following questions are addressed:

1. What are the principals' experiences of understanding the implementation of EMIS in their school?

2. What are the principals' understandings of the contributions of EMIS to the school?

1.3.1 Question 1 – What are the principals' experiences of understanding the implementation of EMIS in their school?

The first research question seeks to examine EMIS through the understandings of the principals. Social constructivist theory poses that knowledge emerges through individual interpretations and social interactions. Thus, principals' understandings of EMIS emerge as reflections are made on their interactions with the technology and their day to day management of the school. Questioning principals with EMIS is of central importance since success with the technology hinges on their leadership. Their interactions give insight to rationale associated with the technology, the coordination of resources, the involvement of stakeholders, and how the technology meshes with existing practices in the school.

1.3.2 Question 2 – What are the principals' understandings of the contributions of EMIS to the school?

The second research question seeks to investigate principals' understandings of EMIS's contributions to the school, through a cross-case analysis of the embedded cases. The intent is to understand the positive and negative aspects of EMIS in the school since the technology has school wide impact and carries implications for the local context (Makhanu, 2010; Prokopiadou, 2012). Understanding the contributions of EMIS provides insight into the changes to leadership and management, particularly the administrative aspects. In this sense, it is important to analyse the contributions of EMIS in order to understand the implications associated with improving/hindering school processes and practices. Principals' views of how and what EMIS is used for in their school provides insight into the contributions of EMIS to their school.

1.4 Structure of Thesis

This thesis is structured into seven chapters. The first chapter introduces the research project, the research purpose, the rationale, the research question and the thesis structure.

The second chapter discusses the context of the research. It begins by discussing the geographical and economical background of The Commonwealth of The Bahamas. This is followed by a discussion of the educational development in The Bahamas, schooling in The Bahamas and leadership and management of Bahamian schools. It also discusses empirical studies on education in The Bahamas. Finally, it discusses current issues in The Bahamas education system.

The third chapter reviews the literature. In doing so, it presents the researchers' attempts to find a theoretical model to understand EMIS. This is followed by a discussion of EMIS drawing primarily from research in developing countries and highlighting relevant aspects relating to leadership. It also discusses conceptualisation of leadership in schools. The chapter ends with a discussion of school leadership and presents principals as the focal point for technology leadership in the school.

The fourth chapter addresses the methodological approach of the study. It begins with a discussion on the research approach and how the researcher's ontological and epistemological understanding of the process warrants a case study approach. It then discusses the researcher's positionality, data collection, data analysis and the pilot study. This is followed by addressing the trustworthiness of the research findings and ethical considerations. This chapter ends by discussing the limitations of this research.

Chapters 5 and 6 discuss the empirical findings. Chapter 5 provides an overview of each principal's leadership to make available understandings of the embedded cases. It then presents findings for each principal's experiences of implementing EMIS and EMIS contributions. Chapter 6 presents a cross case analysis of the embedded cases highlighting principals' understandings of the primary uses of EMIS, and the impact of EMIS on principals' role as leader.

Chapter 7 concludes this thesis by revisiting the research objectives and questions. It then discusses the implications of the findings and outlines the contribution to knowledge. This is followed by recommendations for further research. It concludes with reflections from the researcher about the journey he took to complete his work.

CHATPER 2: CONTEXT OF THE STUDY

This chapter discusses the context of the study and provides insight into the setting where the professional practices of principals in The Bahamas are conducted. It begins by describing the geographical landscape of The Bahamas. This is followed by a brief overview of the historical development of The Bahamas education system. It then discusses public schooling in The Bahamas and the leadership of these schools. This chapter ends with discussions of current issues in The Bahamas education system.

2.1 The Commonwealth of The Bahamas

The description of the research context is linked to the geographical positioning of the participants. Foregrounding the setting is essential in contextualizing the leadership of schools and understanding the extent to which the local setting may impact principals' experiences with EMIS.

2.1.1 Geography of The Bahamas

The location for this study is the Commonwealth of The Bahamas. Tucked between the southern coast of Florida and the northern coast of Cuba, is a chain of over 700 keys and islands called The Bahamas. The Bahamas is a small country with a population of about 350,000 people (DoS, 2012). However it has a notable place in world history since it was the first place Christopher Columbus landed in 1492 on his voyage to discover the new world (Columbus, 2010). Figure - 2.1 shows a map of The Bahamas.

FIGURE-2.1 MAP OF THE BAHAMAS

Source: http://secretariat.thecommonwealth.org/YearbookHomeInternal/140006/

A common distinction made between the keys and islands of The Bahamas is based on inhabitancy. The name 'Family Island' is used as a general reference to all the populated islands of The Bahamas except New Providence. Among these islands 19 are noted as having a public school (DoE, 2011). In addition to the dispersed islands, the bulk of the population migrate to one of the smaller islands – New Providence. Thus, an area 21 miles long and 7 miles wide is home for 70% of the population. This is because people in The Bahamas move away from remote areas to access employment, education and better services (DoS, 2012).

The islands remained under British governance until 1973 (Fransman, 2011). As an independent nation, The Bahamas retains Her Majesty Queen Elizabeth II as the Head of

State and is governed by the common law rules modified by the Act of Settlement (Hunter, 2012).

The local geographical conditions (e.g. the distance of islands from one another, the small size, and scattered nature of the settlements) and the population distribution provide the background conditions under which education services are delivered (Storr, 1983). The scattered nature of the Bahama Islands presents geographical challenges and inclines decision-makers toward services that are deemed to provide improvement to the education system, regardless if these services have foreign origin (Urwick, 2002; Walkine, 2009).

2.1.2 The Bahamas economy

The Bahamas has a GDP of $32 billion, 60% of which comes from the tourism industry (Central Bank, 2012). Together with economic and political stability, the absence of taxation along has attracted foreign investors into The Bahamas making the banking industry the second major industry (Storr, 1983). However, the recent white paper on tax reform outlines government plans to introduce value added tax as of July 2014[1]. The government's intent is to secure revenue to support modern governance and economic growth.

Scholars argue that The Bahamas' reliance on tourism and banking as primary sources of income facilitates a culture susceptible to global trends and international policy (Crossley et al., 2009). Although the tourism industry has brought over one million visitors annually to

[1] For more information see 'A value added tax within a reformed tax system' the government's white paper on tax reform. Available at: http://www.bahamas.gov.bs/wps/wcm/connect/8765bd53-8803-4bd2-9016-55932e7c4a72/White+Paper_Layout+1.pdf?MOD=AJPERES. Accessed January 2014.

The Bahamas, there is an increasing recognition of the need to diversify the country's economic portfolio.

The government places high importance on education and allocates it over US$300 million in the national budget, an estimated 60% of which is allotted for salaries. The government spends 2.8% of this GDP on education and 19.7% of its expenditure on education (Central Bank, 2012). Table-2.1 outlines these figures.

TABLE-2.1 GENERAL STATISTICS ON THE BAHAMAS

	Figure
Growth rate	1.20%
GDP	31, 978
GDP on education	2.80%
Government expenditure on education	19.70%
Available online at: http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=289&IF_Language=eng&BR_Country=440&BR_Region=40520 [Accessed on September 2013]	
HDI ranking	49
Available online at: http://hdrstats.undp.org/images/explanations/BHS.pdf [Accessed on September 2013]	

2.2 Educational development in The Bahamas

This section identifies developments in The Bahamas education system in an effort to address the historical, social and cultural structures impacting upon school leadership.

2.2.1 Education in The Bahamas prior to 1973

Prior to 1973, the main historical developments of the education system in The Bahamas involved the legacy of British colonial rule. Evidence of this is noted throughout Bahamian society in the parliamentary system based on the Westminster model, the judiciary, the English language and the Anglican Church. These are seen as institutional pillars of Bahamian colonial heritage (Storr, 1983).

Storr (1983) noted that administrative controls were implemented into schooling when the British introduced Protestantism through the Anglican Church. He argues that the overall aim of schooling was to improve the morale of the poor through Christian indoctrination, and to select elite individuals through economic positioning and academic testing. The church retained administrative control of schooling in The Bahamas until the Education Act of 1963, which established the Ministry of Education. Through this act, the Minister and Director of Education became the central institutional authority for schooling (Storr, 1983).

Prior to 1973 Bahamian society reflected strong values for schooling. Many of these values have been imported and prevailed in the lives of the majority of the educators. Bethel (1981) noted that the prevailing view of schooling in The Bahamas emerged from its colonial past where formal education was regarded as a means of transcending former status. Johnson (1988) adds that schooling was also an explicit reinforcement of social privilege, the reality of which meant being alienated from the local people. The focus of leadership in schools during this era can be associated with instilling values to facilitate conformity to the state and to reinforcing elitism.

2.2.2 Education in The Bahamas after 1973

In 1973 The Bahamas gained its independence from Great Britain. With this new status the focus of education changed to raise people's level of skills and knowledge so that they could take their place in society and improve their standard of living (Bethel, 1981; Storr, 1983). The 1972 White Paper on Education characterized the education system prior to 1973 as narrow, ill-suited and irrelevant (Bethel, 1981). A new approach for the delivery of educational services was outlined to prepare Bahamians to take advantage of the opportunities available to them and to assume greater responsibility for operating of the

nation's affairs. The changed focus on students intended to enable them to gain a greater sense of belonging and to instil nationality.

After 1973, educational improvement in The Bahamas focused on strengthening the schools, and one of these improvements noted in the education system was the rapid expansion of new schools. These new schools increased the opportunities for all people in The Bahamas to gain access to schooling. Another improvement was the restructuring of the school system into types (primary, junior and senior high schools) and the elimination of the common entrance exam. Through these improvements the social bottle neck that limited the number of spaces available to potential students was eliminated.

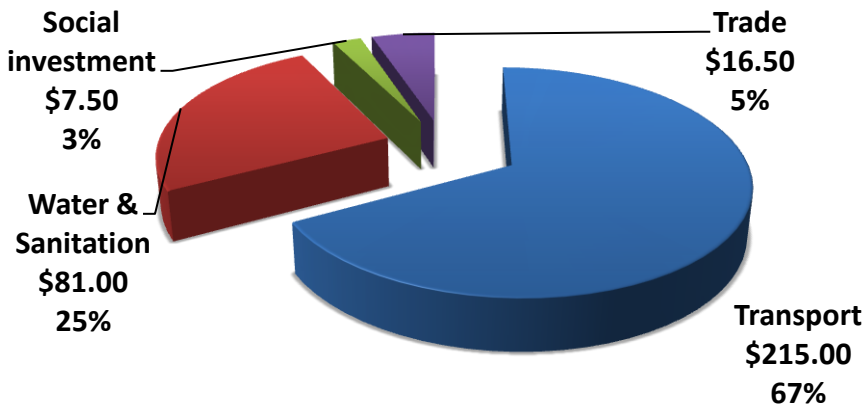
2.2.3 International involvement in Bahamian education

The Bahamas is a member of the Commonwealth and an active member in the United Nations Educational, Scientific and Cultural Organization (UNESCO) [2]. It has relied on support from the Inter-American Development Bank (IDB) for funding. The amount of funds the government has received from the IDB during the period of 2008-2013 is estimated at US$320 million[3]. In 2005, the government signed an agreement with the IDB for US$60 million for investment in education, of which US$18 million has been allocated[4]. The loan was granted to allow the government to implement the approved initiatives. With the funds the government built two senior high schools and provided a management information

[2] For more information on the involvement in UNESCO see http://www.bahamascommission-unesco.org/pages/Default.aspx?pageId=e939f098-c015-4b69-b52f-4ca5f5605ff3. Last accessed May 2013.
[3] For more information see http://www.iadb.org/en/countries/bahamas/bahamas-and-the-idb,1035.html. Last accessed May 2013.
[4] For more information see http://www.iadb.org/en/projects/project-description-title,1303.html?id=BH-L1003. Last accessed May 2013.

system[5]. This information system is what this study will investigate. Figure - 2.2 outlines the funding received from the IDB by The Bahamas.

FIGURE-2.5 BAHAMAS IDB FUNDING



Source: IDB website http://www.iadb.org/en/countries/bahamas/bahamas-and-the-idb,1035.html. Last accessed May 2013.

There is an overall assumption that developing countries, like The Bahamas, have a great advantage when implementing modern technology since it is readily available and does not have to be reinvented (Buabeng-Andoh, 2012; Richardson et al., 2013; Voogt et al., 2013). In developing countries throughout the world, governments are compelled to participate in global digital information transition (Jhurree, 2005). Many international aid agencies view the education management information system (EMIS) as a way of improving educational management and effectively disseminate data and information. Although Crossley and Sprague (2012) argue that small countries, such as The Bahamas, have much innovative experience to share in international development, there seems to be more reliance on

[5] For more information on the Ministry of Education IDB Project see the web site http://www.bahamaseducation.com/idb.html which was last accessed on May 2013.

international development and donor agencies to participate in the global digital transition. From this view, support from international funding and donor agencies signals a shift towards a more global view of education.

2.3 Public schooling in The Bahamas

The DoE has the overall responsibility for overseeing the operations of all government fully funded schools. The vision of DoE is:

> *To ensure that all persons in the Commonwealth of The Bahamas develop physically, mentally, socially and spiritually in order to function responsibly and productively in an increasingly dynamic, technological and complex society (MoE, 2014).*

This vision statement indicates the openness DoE has with regards to developing its education system, and the link between education and technology.

2.3.1 The Bahamas schooling statistics

Public schooling in The Bahamas is freely available to students of all ages. The Bahamas 2006 statistics reveal that there are a total of 251 schools. Table - 2.2 shows 160, or 64%, of the schools in The Bahamas are public schools. The MoE boasts an adult literacy rate of 95% with over 3,000 teachers and instructors, averaging 1 teacher for every 16 to 25 students in private schools and 20 to 30 students in public schools (see also Table - 2.3).

TABLE-2.2 NUMBER OF SCHOOLS BY TYPE

School Type	Public	Private	Total
Preschool	4	0	**4**
Primary	96	33	**129**
Junior	7	2	**9**
Senior	7	1	**8**
Secondary	21	8	**29**
All-age	15	39	**54**
Special	10	8	**18**
Total	**160**	**91**	**251**

Source: The Bahamas Education Statistics Digest 2006

TABLE-2.3 SCHOOL STATISTICS

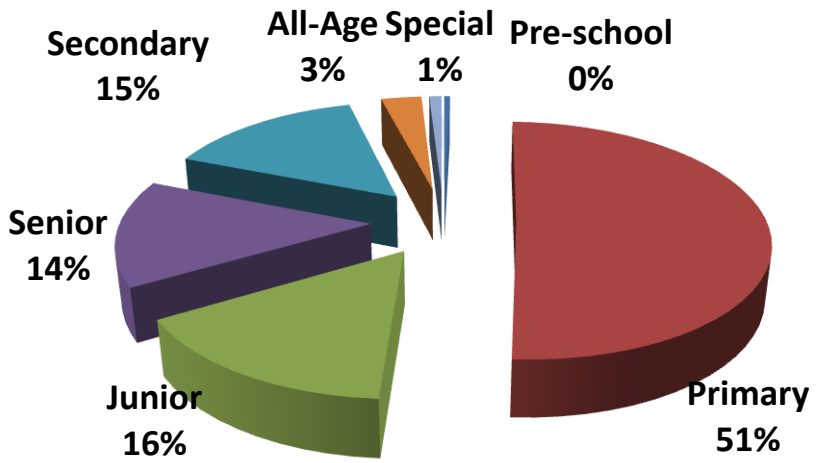
	Figure
Student teacher ratio	18:1 primary 16:1 secondary
Student enrolment	90% primary 84% secondary
Available online at: http://www.childinfo.org/files/LAC_Bahamas.pdf [Accessed on September 2013]	

The Bahamas have a total of 160 public schools which are sorted by school type. Figure - 2.3 displays the distribution of schools in The Bahamas by type and the percentage of each school. These include:

- *preschool* which provides schooling to students aged 3 to 4 years;
- *primary* which provides schooling to students aged 5 to 11 years;
- *junior high* which provides schooling to students aged 12 to 14 years;

- *senior high* 15 to 17 years;
- *secondary* 11 to 17 years, and can be seen as an amalgamation of junior and senior high;
- *all-age* which provides schooling to students age 5 to 17, and can be seen as an amalgamation of primary, junior and senior high; and
- *special* which provides schooling to student with disabilities[6] (MoE, 2007).

FIGURE-2.3 SCHOOL ENROLMENT BY TYPE

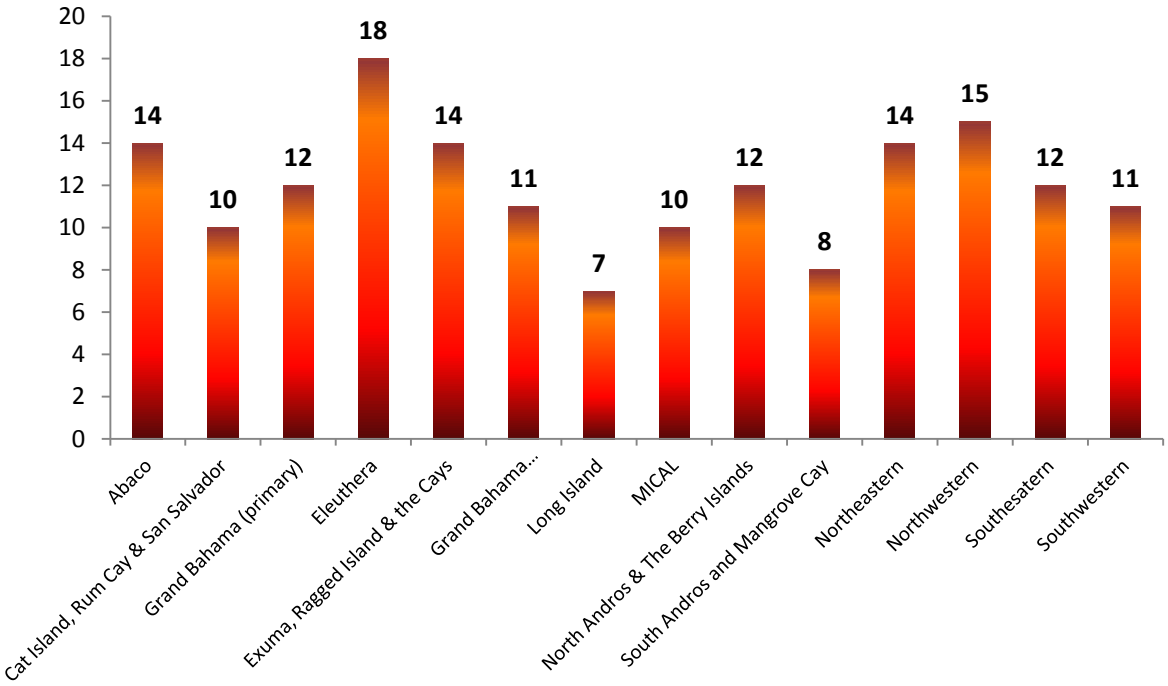


In addition to the distribution of school by type, schools in The Bahamas are sorted into 14 districts. These include Abaco District with 14 schools; Cat Island, Rum Cay and San Salvador District with 10 schools; Grand Bahama District with 12 schools; Eleuthera District with 18 schools; Exuma, Ragged Island and the Cays District with 14 schools; Long Island District with 7 schools; Mayaguana, Inagua, Crooked Island and Long Island District with 10

[6] These students have challenges ranging from mental, sensory abilities, neuromuscular or physical characteristics; social or emotional behaviour, communication abilities; and multiple handicaps (MoE, 2006).

schools; North Andros and the Berry Island District with 12 schools; South Andros District with 8 schools; Northeastern District with 14 schools; Northwestern District with 15 schools; Southeastern District with 12 schools; and Southwestern District with 11 schools. Figure - 2.4 displays the number of schools in each district.

FIGURE-2.4 SCHOOLS BY DISTRICT



Among the 14 districts, 4 are located in New Providence. The six participants in this study are selected from districts located in New Providence. All of the schools who implemented EMIS are located in New Providence with one exception, which is in the Grand Bahama District.

2.3.2 Technological infrastructure in Bahamian schools

In general, schools in The Bahamas are characterized as having a good technological infrastructure, which includes the existence of high speed internet access, computer labs and

a variety of software for students and staff. The primary operating system is Windows and the more advanced schools have a networking system operated by a local server[7]. Although schools have technical infrastructure, challenges exist in acquiring and maintaining that infrastructure. For example, acquiring computers often involves reliance on fund raising efforts, on private donations or on school board sponsors. With regards to maintenance, when a technical problem occurs the school administration has to make a report to the Ministry of Education (MoE) Management Information Systems unit (MIS). After the issue has been documented the MIS technician would go on site to address the problem. Some problems tend to be minor, such as resetting a server; while others involve the technician removing the equipment off site to be repaired. Reliance on the MIS for maintenance of the school's technological infrastructure challenges the school's ability to effectively use technology, especially when a problem persists for days, or even weeks.

The time lag in addressing the school's technical problems, together with the communication challenges with MIS staff, has contributed to disruptions in the day-to-day use of technology in schools. In addition to the disruption of operations, schools have struggled with the distribution of resources. The DoE is limited in its capacity to distribute the supply of resources to all schools equally. This disparity is particularly noted in the schools on the Family Islands[8] where requests for instructional resources, administrative equipment and building materials remain outstanding. The disparity is also noted in the distribution of technical supplies such as online learning resource sites, whiteboards, computers, servers and networking devices.

[7] This is a general statement about The Bahamas education system in New Providence, since some schools in 'The Family Islands' do not have these features.
[8] The Bahamas is made up of a collection of small islands. Although there are 13 main inhabited islands, Family Island is name used when referring to anyone or some of the islands.

Although schools have access to computers, the internet and networks, these tend to be allocated for students. Computers are distributed in labs and are used primarily for instructional purposes. Teachers desiring to use computers would have to juggle between their teaching schedule, the availability of the labs and competition from other teachers. Computers are also available for teachers in the staff lounge and resource room but in most schools these computers are few when compared to the number of users. Computers are also found in the schools' administrative offices where clerks, secretaries and members of the administrative staff conduct their work. Unfortunately, teachers are often neglected in the allocation of computers, which is surprising, since most of the work done by EMIS requires the input of teachers. Although the DoE is striving for equality, the contribution of technology to the school is still compromised by unequal resource distribution between schools. Little of the promised results from innovative technology seem to be filtering down to local schools and the results of school improvement with technology, in some instances, remain 'patchy'[9].

EMIS in the education system

EMIS used in this study can also be referred to as information systems, student information system, student management system and information technology in education management (discussed further in section 3.2). EMIS is computerised database software used to manage

[9] Younie (2006) offers an analytical review of the relationship between national ICT policy and local school implementation. She believes that the connection between the two tends to be tenuous, resulting from a failure to grasp the complexity of national policy integration and the local institutional environment across a diverse patchwork of locally-administered schools. This was experienced at the first stages when I took responsibility for EMIS. At one of the schools the software was installed but no one at the school knew the password to get into the technology nor understood whether or not the technology was properly installed. Also the time period between training exercises which were given to administrators in the school and the time when the technology was installed seemed too long for the information acquired during the training to be recalled. Consequently, administrators who did remember how to use the programme used it partially.

school information and data. With this technology school administrators are able to perform a variety of functions some of the more commonly recognised uses include: managing student attendance, grades, discipline records and registration processes; developing school schedules; tracking school finances; managing school records; and other school business processes. Since this study began, 25 out of 160 public schools in The Bahamas have been supplied with EMIS.

The Bahamas became particularly interested in technological improvements by investigating the possibility of using EMIS. Thus an international consultant was brought in to identify what could be done to develop the overall education system. The consultation resulted in decision-makers at the DoE identifying the need for EMIS. Funding for the technology was provided by IDB, and MIS installed the technology in selected schools. The DoE purchased EMIS with expectations that its electronic functionality would facilitate improvements in the education system.

Expectations for EMIS

Through consultation and the support from IDB, senior management at the DoE decided on a technical approach to improve the management of schools[10]. Evidence of this decision is noted in the ten year plan and in a memorandum (memo) sent to principals[11]. The DoE ten year plan states that technology would '*play an important role in improving the efficient management of education*'. This improvement would come through the '*employment of "cutting edge" technology and the deployment of responsibilities through the process of*

[10] Given the pressures for school improvement and modernization schools have resorted to the use of technology (Slowinski, 2003; Lightfoot, 2014). The government adoption of EMIS is consistent with concerns of being able to show the capacity to function in the technological age.
[11] A copy of the memo is found in Appendix – A.

decentralisation' (DoE, 2009). The memo, addressed to principals, provided the formal written communication between DoE and principals; it represented a call to action for schools to use EMIS. Although this memo came from the Director of Education as a concise one page document addressed to all district superintendents and principals of government schools, only the 15 schools involved with EMIS were given a copy since they were directly involved with the technology.

Realising that the new technology needed support, senior management assembled a project team to provide leadership. The project team was to ensure the success of the pilot through leadership and training activities. Assigning the project team was a form of administrative decentralization that allowed decision making with EMIS to remain at senior management level (Smith, 1986; Astiz et al., 2002; Kumar and Misra, 2007; Shah, 2009), and although several schools had EMIS installed during 1999-2000, the memo (which was written in 2008) was the first documented communication from senior management. Shrouded within the memo were senior management's expectations for EMIS; these were expressed through a sense of satisfaction with the outcomes of EMIS, some of which included inserting student data into the technology, using the mark books and producing report cards. By focusing on the outcomes, senior management highlighted specific aspects of EMIS that they deem relevant, while at the same time ignored contextual aspects relevant to the local school (e.g. adjustment in practices, norms and leadership roles). Focusing on the outcomes also resulted in the commonly accepted belief that success with EMIS was expected without due consideration of implementation at the school level (Gabregiorgis, 1979; Goldring et al., 2002). In essence the users in the school, interactions with stakeholders, school processes and practices associated with bringing about success with the technology were overlooked. This casual linkage between 'success' and EMIS overlooks the nested layers of complexity

associated with EMIS in context (Murillo, 2007; Kyriakides et al., 2009; Jahan, 2010). Expectations for EMIS, as outlined in the memo, were regarded as important since it initiated and brought together the actions and operations of school leaders. These expectations are believed to be associated with the technical approach to school improvement and are central to work expectations in the schools.

The extent to which EMIS was implemented, how it was used and the impact upon leadership roles will be investigated through the understandings of school principals. Knowledge is obtained of the leadership views associated with the technology by exploring EMIS through these leaders.

2.4 Leadership and management of Bahamian schools

This section discusses the leadership of schools in The Bahamas by providing an overview of the responsibilities of principals. Thus, it intends to help the reader contextualize the leadership of principals in the Bahamian context.

2.4.1 Qualification and duties of principals

The DoE is responsible for the selection of principals and the selection criteria are as follows (BUT, 1994):

- A Master's Degree and professional teaching qualifications from an approved institution;
- A minimum of five years experience as Vice Principal;
- A minimum of 10 years successful teaching experience.

In addition, the duties of principals include:

- leading the implementation of all school activities;
- providing leadership by setting the climate for high achievement in the school;
- providing professional development opportunities for staff members;
- organizing and supervising schedules, assignments and teachers;
- liaising with the superintendent on school operations;
- communicating with MoE on educational and civic matters; and
- supervising instructional programmes in the school.

Principals are expected to take responsibility for all activities and resources in the school; take responsibility for the accurate accounting of school funds; be dedicated to the successful accomplishment of school activities; involve stakeholders in the decision making; be responsible for implementing and managing the policies, regulations and procedures of the DoE; work collaboratively for effective school/community relationships; and have excellent leadership, organizational and communication skills (BUT, 1994; Jobchart, 2007). Typically, each school has one principal, a senior mistress and senior master. The junior and senior high schools tend to have vice principals.

The role driven atmosphere within the education system contributes to a mode of leadership that is cautious and foresighted. Principals tend to examine their practices and assess their decision making in relation to the common understandings of the schools and their leadership position. Despite the existing mode of leadership principals are looked upon as the authority in the school and have high regard for their role as educational leaders (Davis, 2014). Principals actively assert their influence in the school and have been noted to be a major

contributor to the establishment and sustainability of the prevailing culture in schools (Hall-Campbell, 2011). These assertions, or lack of assertions, contribute to the uniqueness of principals' leadership in the Bahamian education context.

2.4.2 Leadership and management activities in Bahamian schools

The leadership and management activities of the principal are highly complex and challenging. In general, these activities are associated with high levels of stress which is due to the increase expectations related to the position (Bryant, 2012). Principals spend most of their time on staffing issues, planning school activities, managing students (e.g. discipline issues) and in meetings with stakeholders. Several of the principals' areas of management are discussed further, these include below. These include staff, students, instructional programme, calendar, school opening and closing, registration, timetabling and finance.

Managing staff

There are several members of staff that principals supervise in the school; these include teaching staff, support staff, and administrative staff. In addition, there are two types of teaching roles in schools, subject teaching and home room teaching. Supervising the subject teachers involves ensuring delivery of appropriate instructional objectives, coordinating substitutions, ensuring appropriate attendance checks, and maintaining an environment in the classroom conducive to learning. In addition, principals also supervise subject teachers' records (e.g. mark book, lesson plans, and attendance records) by performing regular checks to make certain that the standard information is recorded and kept up-to-date. Supervising homeroom teachers involves checking the appropriate recording of students' attendance which occurs during morning and afternoon registration; checking that devotional exercises

occur during the morning registration and ensuring that the school's administrative concerns are communicated to students; and checking that students are provided with proper pastoral supervision (DoE, 1983).

The ongoing shortage of teaching staff has led to the recruitment of teachers from other countries (MoE, 2005a; BUT, 2013, Bahamas B2B, 2013) and introduced challenges for the management of the teaching staff. In addition, the teaching staff is well-represented by a union and major changes to the day-to-day responsibilities of the teachers often stir up union interest[12]. Principals tend to be sensitive to issues that cause union involvement and their interests are heightened with the mere mention of bringing something new into the school, even if the initiative comes from the DoE.

The support staff assist principals with coordinating the cleanliness and maintenance of the school compound. The administrative staff assist with the day-to-day operation of the school office, the supervision of the school compound, the instructional objectives, staff organization and other duties assigned by principals (DoE, 2004).

Principals are expected to manage both teaching and non-teaching staff at their schools. This involves managing teacher workloads, attendance and punctuality, disciplinary issues, teacher performance and requests for leave such as maternity and study. Although the DoE is responsible for hiring and dismissing teachers, principals have an influential role in transferring teachers in and out of their schools. In addition, principals have the responsibility

[12] The Bahamas Union of Teachers represents teachers concerns. The vision of the BUT is to provide quality representation to all workers in the Education Sector in The Commonwealth of The Bahamas. The BUT have successfully negotiated the Collective Bargaining Agreement 2010 - 2013 with salary increases, lump sum payments, increments, medical insurance paid 80% by the government, and improved terms and conditions of service. The union has also put in place a retirement fund for members, emergency loan programmes and conduct regular visits to school districts. This information about the BUT can be obtained from the web http://teachersvoicebahamas.com/. Last accessed May 2013.

of keeping up-to-date records, facilitate staff requests and make recommendations to the DoE. This includes records of teachers' attendance, qualifications, professional development and performance reports. The performance report is conducted by the principal and is usually carried out at the end of the academic year. This report is reviewed by DoE officials before teachers are promoted and awarded their incremental salary increase.

At the beginning of the school year principals are assigned their school staff by the DoE. When reporting to work, teachers are expected to sign in and out on the staff attendance register, which is usually placed in a readily accessible area in the school office. At predetermined periods during the school year principals observe teachers in the classroom and at the end of the school year prepare a report. Principals often have challenges with keeping staff records up-to-date since official records on teachers are kept at the DoE, however, principals have to answer frequent requests from the DoE officials concerning staffing information.

Managing students

There has been increasing concern about the number of students in school (Lightbourne, 2012; Smith, 2012). Some schools are over-crowded which is partly due to regional immigration into The Bahamas (Bakker et al., 2011). Violence in schools is also an area of concern (Rose, 2008; Jones, 2014). Through a collaborative effort with BUT, PTAs, local law enforcement agencies, advisory council on education and the Department of Social services, the DoE has compiled a protocol for safe schools in order to promote an environment conducive to student learning (DoE, 2009a). These concerns, coupled with the focus on examination results and the lack of parental involvement, are the major concerns in managing students.

Managing the instructional programme

One of the responsibilities of principals involves the effective delivery of the instructional programme. This responsibility is recognised through student performance (Bryant, 2012) and reflects traces of the British educational system, particularly with regards to examinations. The Bahamas national examinations include the Grade Level Assessment Test (GLAT), The Bahamas General Certificate of Secondary Education (BGCSE), and The Bahamas Junior Certificate examination (BJC). The GLAT is generally taken at grades 3 and 6, and is used to identify students' weaknesses and strengths in language arts and mathematics. In addition, social studies and science are also taken at grade 6. The BJC examinations are generally taken at grade 9 and include a total of 10 subject areas. The BGCSE is generally taken at grade 12 and include 25 subject areas (MoE, 2012). The more advanced students are encouraged to take the BJC and BGCSE in earlier grades, especially since passing marks reflect positively on the school.

The government has an agreement with the University of Cambridge to oversee the development of the BGCSE examinations. This exit examination assesses the performance of students in 27 subject areas. A 7 point scale is used to assess the exam, with grades ranging from A to G (DoE, 2012). In The Bahamas the BGCSE exam is given at two levels: the core level, which involves papers 1 and 2 but the highest grade a student can obtain is a C; the extended level involves papers 1, 2 and 3, where students can obtain grades A or B (DoE, 2012). School leaders are advised to screen students so that they take the exam at the level (e.g. core or extended) appropriate for them. This screening process has great implications for principals' supervision of the academic performance of students, the instructional programme and leadership of the teaching staff (MoE, 2010).

The DoE (2012) *National Exam Data* reveals that there were 32,978 candidate entries for the BJC examinations, of which 42% passed with a grade of A, B or C. Of the 9,009 candidates that took five or more subjects in the BJC examinations, 14% passed with a grade of A, B or C. DoE exam statistics also revealed that there were 26,054 candidate entries for the BGCSE examinations, of which 47% passed with a grade of A, B, or C. Of the 7,117 candidates that took the BGCSE examination, 13% passed at least five subjects with a grade of A, B, or C.

Although national examination results show slight improvement from previous years, the focus on academic achievement remains a point of concern. Some schools are challenged in finding an up-to-date written curriculum to guide teaching practices. The shortage of written curriculum impacts how students perform in national examinations and the delivery of the instructional programme. Additional pressure is placed on school leaders since the school's results are made public and tend to be a reflection of the school's success. Of importance to this study is the implication this has for the leadership in schools and the focus it places on students' examination performance.

Managing the school calendar

For the teaching staff the school calendar year begins in August, ends in June and is divided into three terms: Christmas, Easter and Summer. Christmas term begins in August and ends in December; Easter term begins in January and ends in April; and Summer term begins in April and ends in June. The opening and closing dates are stipulated by the DoE and 'must be strictly adhered to'. Changes to the school calendar require permission from the DoE. The school calendar is divided into academic years and 191 school days equates to one school year. The number of days for teaching and administrative staff is 10 - 14 days longer than that of students to allow time for preparation at the beginning of the academic year and closure at

the end of the year. The hours of attendance for students are from 8:45 am to 3:00 pm and teachers are required to arrive and leave the school campus 'at least a quarter of an hour before and after' this time (DoE, 2011).

Much of the activity that takes place in schools is coordinated around the school calendar. Thus, some events and practices occur on a yearly schedule across all school levels. For example, producing the schools' end of term report cards is a process conducted by all schools in The Bahamas. The DoE designates a day, referred to as the National Report Card Day, and allocates three 'working days' in the school calendar at the end of every term for the preparation of school reports (DoE, 2011b). During the 'working days' students are released from school while teachers mark final exams and prepare the school's end of term records. In addition, administrators prepare report cards to be handed to parents during the National Report Card Day.

The traditional process of producing the end of term report card involves an administrator purchasing carbon copied templates of the printed report to be distributed to homeroom teachers who would write on the report cards student's name, grade and demographic information. The process has to be repeated by every teacher for every pupil. The report cards are then placed in a secure area readily accessible by subject teachers, who would manually transfer students' grades from their mark books to the appropriate report card[13]. To complete

[13] The grades that were recorded onto the report cards required three sets of calculations by teachers; two by subject teachers and one by homeroom teachers. The calculations were as follows: The subject teacher manually calculated the average grade from each student's assessment. This average grade is referred to as the 'term grade' and it accounts for 60% of the students' 'final term grade'. The subject teacher would use the student's 'final exam grade', which accounted for 40% of the 'final term grade', together with the 'term grade' to calculate the students' 'final term grade'. Once the term and exam grades were recorded onto the report cards the homeroom teacher would calculate the grade point average (GPA). GPA is the average grade on a four point scale of all subject grades given to a student during the term. Some schools, particularly the senior high schools, would calculate an accumulated GPA for students. This score was the average GPA earned during the time at the senior high school. In addition, homeroom teachers were previously responsible for writing comments to reflect

the report card process, administrators would manually sign each report card and randomly check for spelling errors and calculation errors. Unlike other school documents, such as the grade book, master schedule or attendance record, the report card is one of the more important records produced and distributed by the school since it is intertwined with the Bahamian culture. Since schools are required to generate report cards for all students, each student has to be accounted for in EMIS. Also, the national report card requires all teachers to produce a final subject grade for all students taught. Therefore, all teachers are required to have login access to EMIS to produce grades. Report cards are produced twice a year at the end of the Christmas and Summer terms, and this practice mediated when users accessed EMIS, especially since work has to be completed within a given time frame.

Near the end of term school administrators tend to be extremely busy preparing end of term report cards, preparing for the term closure and ensuring timely completion of tasks before teachers and students leave for the end of term break.

Managing school opening and closing

The opening and closing of schools are events that occur on a yearly schedule set by the DoE. The school opening process involves completing facility repairs and painting to ensure that the school building is functional. As the first day of school approaches, activities are planned for the staff (e.g. meetings, workshops), the required supplies are secured and a 'walk about'[14] is usually conducted. One of the challenges principals face with school opening involves knowing where they are posted. The DoE assigns principals to school and notice of

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students' overall behaviour and attitude throughout the term. The senior and junior high schools would also allow subject teachers to insert comments on student's end of term report cards.

[14] 'Walk about' is a term used to describe the process where the school staff walks through the neighbourhood to introduce themselves to the community.

placement occurs weeks, sometimes days, before school opens. The late posting and shuffling of staff by the DoE leaves principals little time to prepare and conduct school opening activities. Incidences of late positing have occurred where the DoE assigns a principal to a different location, even after the school term has begun. All of these present challenges for how principals manage the opening of schools.

The school closure process involves securing the school data collected from the daily activities occurring throughout the school term. In addition, report cards are distributed to parents, reports for the DoE are prepared, and the end of year graduation exercise is conducted. At the end of the school year information on student graduates are stored and results of external exams are recorded and, if required, forwarded to students. One of the challenges principals face with school closure involves securing school records. Prior to EMIS, all school records were produced manually either in registers, files or report books. These were stored initially on site in secured filing cabinets and then at the DoE Registry. The accuracy, longevity and accessibility of these records have therefore been a challenge as records tend to get misplaced and lost.

Managing registration and timetabling

Registration involves admitting students into the school system. The process takes place at the local school during the summer period and is led by the principal with the input of the district superintendent. There are three types of registrants in the public school system. These include: returning student, transferring student and new student. The administrative process associated with registering students involves assigning students a number, recording their demographic and medical information in the student register and the student's confidential file. Students are also assigned to one of the school groups. Although public schooling in The

Bahamas is ‘free’, students are asked to pay a registration fee that varies between schools. Although registration is an annual process, students tend to be registered without the proper information and documentation.

Timetabling involves scheduling students and teachers to homerooms, subject classes and classrooms. One of the challenges with timetabling is maximizing the use of all teachers and learning spaces whilst avoiding clashes (i.e. one class scheduled for two subjects or one teacher for two classes at the same time). Principals lead the administrative staff through the timetable process every new school year. This activity is done manually and begins during the summer before the new school year. The final timetable is presented in a chart format which is enlarged and placed in a central area in the administrative office. Appendix - E shows a timetable posted in one of the schools used in this study. When the new school year begins teachers and students are given their personal timetables.

Managing school finance

Principals are accountable for the management of the school finances, which are made up of DoE allowances, student fees, fund raising efforts, tuck shop profit and public donations. Principals are also accountable for all expenditures made directly by the school, such as purchasing of students’ sports uniforms and school supplies. It is their responsibility to inform the DoE of any inventory needed, including school furniture and equipment. Each school has a school board to promote accountability in the use of public funds. Members of the school board serve for a term and are encouraged to be active participants in the activities of the school. Some of the challenges principals face when managing school finances include accurate reporting of data, tracking allocations of funds, and keeping administrative staff accountable for work responsibilities.

In addition, principals are also expected to perform other administrative duties such as conducting parents meetings, planning professional development training for staff, working in collaboration with other schools on certain projects or activities, and ensuring a safe and secure school environment in collaboration with the DoE.

2.5 Empirical studies on education in The Bahamas

This section presents a brief overview of empirical work conducted on education in The Bahamas in order to highlight leadership issues in the Bahamian education system.

Davis (2009) examined the perception of the barriers to participation in secondary and post-secondary education. Her findings highlight the connection between school leadership and students' perceptions of their academic development. She argues that the practices and processes of the education system can hinder students' academic development, and calls for school leaders to focus on increasing students' participation in the development of their education practices. Her study encourages decision makers to consider the perceptions of leaders in the local context when introducing programmes geared toward student development.

Cleare (2011) examined the experiences of three Bahamian students pursuing degrees in American universities and the relationship to their previous high school experiences with mathematics. She notes that the instructional processes play an important role in developing students' understanding, confidence and agency at university. Her study highlights a challenge leaders have when preparing students for life after high school. That is, should students be prepared for university, the work environment or social integration into society? She argues that principals' understandings of the most important factors of schooling have great implications for the focus of leadership in their schools.

Demissie (2011) explored factors that hinder the use of web-based portals by school stakeholders. The aim of her study was to investigate whether or not UTAUT[15] could be used to understand the use of the web-based portal across social contexts. She believed that identifying factors associated with the use of the web-based portal would lead to an increased understanding of the cultural activities associated with how school communities share information. In essence, how parents interact with school leaders. Her findings reveal that the use of technology in schools is impacted by the understandings of the user on the technology and the stakeholders' expectations of how the technology should be used. This seems to imply that EMIS would be greatly impacted by stakeholders' expectations and leaders' understanding of the technology.

Walkine (2009) investigated the use of oral traditions to help students develop a sense of cultural identity. He describes oral traditions as the practices and interpretation used to depict the beliefs, customs and stories passed on through generations. He argues that within oral traditions are coded messages of culture where areas of distrust, concern and belief are represented. He also argues that oral traditions are an important part of the Bahamian culture, and that the instructional practices in the schools develop cultural identity among Bahamian students. His study findings encourage the production of Bahamian learning material and the use of Bahamian references in instructional practices. This study highlights that representations of the Bahamian culture are embedded in discourse and contribute to the Bahamian identity in education. This means that Bahamian educational leaders would tend to appreciate the cultural heritage of The Bahamas and favour materials that are culturally relevant. Thus, the leadership in the Bahamian education system are sensitive toward locally

[15] Demissie (2009) explains UTAUT as a framework for analysing behaviours associated with the adoption and use of an education-oriented information system in a cultural setting. The framework is the compilation of researchers understanding of eight models used in technology acceptance and use.

produced knowledge and service. The sensitivity toward the Bahamian material is echoed by Dames (2010) who highlights the importance of Bahamianization[16] of the education system.

Hall-Campbell (2011) investigated the Bahamian education system by exploring the relationship between the school environment and teachers' pedagogic beliefs in secondary education. She argues that the school environment affects teachers' pedagogy and impacts upon student success. Her findings reveal that culture in the Bahamian context is expressed through an emphasis on 'being Bahamian'. She describes 'being Bahamian' as having a deep awareness of all things Bahamian and to express this awareness free of other dominant cultural influences. She argues that products and services that appear not to facilitate a cultural connection to being Bahamian are opposed. Her study highlights the cultural sensitivity associated with leadership in The Bahamas education system and the preference for programmes that allow such connections.

2.6 Current issues in The Bahamas education system

This section addresses current issues in The Bahamas education system with the intent of bringing areas where the leadership of school are focused to the forefront.

Over the years the public schooling system has been declining in the quality of education. Some have criticized the government's casual administration, managerial inertia and bureaucratic red tape for its contribution to failures in the education system (Urwick, 2002; Massey, 2008). The lack of student discipline in schools has been noted (DoE, 2009a). Much of the criticisms have been associated with the marks students receive in the national

[16] Dames (2010) used this term to describe the expansion of The Bahamas where Bahamians take control of the future of The Bahamas though developing local products, businesses and services. The aim is to enable the people of The Bahamas to have ownership of the country instead of foreign business, and to have leadership positions in all local companies and businesses.

examinations. The MoE reports have revealed that the national BGCSE result average is a 'D' (MoE, 2012). Collie-Patterson (1999) conducted a study on students' performance in national examinations and noted that the school climate is a major factor affecting exam results.

Related to the school climate but not specifically to Collie-Patterson's survey is the lack of flexibility in leadership where principals are encouraged to exercise autonomy in the school to facilitate student performance. Much of the criticisms of the education systems has caused the leadership of school to be called into question and facilitated public interest in private schooling[17]. Although much public attention has been focused on the DoE, the roles of principals are indirectly affected. Facing the sense of criticism, principals have become more reflexive in their management practices and seem to engage with activities that establish their ability to function as an effective school leader. Thus, principals tend to value those aspects of school leadership that reflect favourable national examinations scores, e.g. scores of 'A - C'.

2.7 Summary

This chapter has discussed the context of the study. This has revealed that leadership in The Bahamian educational context is challenging, complex and highly sensitive to being Bahamian. The discussion highlights factors, i.e. the geographical orientation, the school calendar, and Bahaminization, which may affect principals' understandings. Implementing EMIS without knowledge of the challenges, complexity and sensitivity associated with context and how these impact upon the technology, challenges success with the technology (Watson, 2006).

[17] Although private schooling is more expensive than public schools, there is a common public perception that students in private schools perform better on national examinations.

Considering the huge investments made into EMIS, there is limited research study focusing on the leadership perspective. It is appropriate then that this study seeks to investigate understands of leaders associated with the technology.

CHAPTER 3: LITERATURE REVIEW

The study of EMIS is still relatively new. This chapter begins by reviewing literature used to investigate technology in an attempt to situate EMIS within a theoretical framework. Arguments are made for reliance on a social constructivist view of EMIS. It then discusses EMIS in developing countries. This is followed by a discussion on the common types of leadership in schools. Finally, it discusses the principal as technology leader.

3.1 Situating EMIS

As stated in chapter 1, this research has developed from concerns that emerged as the researcher worked as an insider for the DoE to effectively implement EMIS.As a researcher now, the aim is to understand the leadership of EMIS. Although the study favours the principals' view, the intent is to explore aspects of EMIS at the practice level rather than the policy level in order to facilitate understanding from practitioners. EMIS in this study is computerized database technology used to manage school information and data (see discussion in section 2.3.2). The technology affords school administrators the ability to perform a variety of electronic functions with school data.

Initially, a model was sought to conceptualize EMIS beyond the traditional determinist approach that limits technology to a self-governing force external to actors and the local context (Olsen and Lucas, 1982). The determinist approach overlooks the social and contextual factors that underpin knowledge with EMIS. The researcher's rationale for finding a model was to rely on defined conditions and functions that would provide guidance and direction for understanding EMIS in context. Several models were reviewed, but three of the more common that seemed applicable for focus on principals' understanding of EMIS are

briefly discussed below. These include human-computer interaction (HCI), technology acceptance model (TAM) and activity theory (AT).

3.1.1 Technology Acceptance Model

One of the more widely used approaches to analysing technology in organizations is the technology acceptance model (TAM) (Davies et al., 1989; Park, 2009; Teo, 2009). Building on the logic of Rogers' (2003) diffusion of innovation, TAM focuses on the perceived usefulness, i.e. the degree to which a person believes that using a particular technology would enhance job performance, and perceived ease of use, i.e. the degree to which a person believes that using a particular technology would be free of effort (Davis et al., 1989). TAM has received empirical support as a model that guides behaviour and intentionality when using technology (McKinnon and Igonor, 2008; Park, 2009). Adopting the TAM model as an approach to investigate the leadership perspective of EMIS would place focus primarily on the users' interactions with the technology and ignore the social interactions and contextual issues underpinning the users' interactions. Researchers have recognised the need for the model to be modified to account for specific context and social interactions (McKinnon et al., 2008; Park, 2009; Teo, 2009). An example of such modification includes taking into account political, cultural, structural and environmental factors when implementing foreign technologies.

3.1.2 Human-computer interaction

Human-computer interaction (HCI) as the study of the interaction between computers and humans, is concerned with the physical, psychological and organizational aspects of this

interaction (Shackel, 2009). HCI is often used interchangeably with ergonomics[18]. Both are concerned with the user's experience using a computer.[19] HCI's strength as a model is in the emphasis placed on the computer's impact on work and the influence it has on the user's interaction (Dix et al., 2004:222). HCI is not just about the computer as an artefact but also about understanding how the computer, the user and the environment affect and are affected by each other. Adopting the HCI model to investigate the leadership perspective of EMIS would place focus on the point where users interact with the computer.

Khwaldeh (2011) used HCI as a methodological framework to investigate how deaf students used a learning management system (LMS). His study revealed that the HCI is helpful in analysing deaf students' experiences with an LMS and recommendations were made for the LMS to be more flexible in order to support further developments with data handling. Although this study considered the social and organizational context of the computer in relation to its impact on work practice, the determinist view seems to be prevalent.

The HCI researchers argue that much of users' interaction with computers involves goal seeking behaviour that is influenced by the user and the context (Dix et al., 2004:451; Kaptelinin and Nardi, 2012). One of the challenges with using HCI as a model to understand the leadership perspective of EMIS is that it overlooks the organizational and individual factors that are not directly associated with users' interactions with the technology. For example, EMIS may come as a directive from senior officials and principals may not be

[18] Ergonomics is the scientific discipline concerned with understanding the characteristics of the interaction between the computer and the user (Dix et al., 2004:131). It is concerned with the relationship between humans and their technological tools and environments. The focus is on the interaction and how the interface supports or hinders this interaction.

[19] The user experience (UX) relates to the ambient, product and user factors that affect the cognitive processes of the user. UX focuses on the relations and entities that form an ecosystem (environment) in which technology functions (Zhou, et al., 2011).

supportive of such initiative. Principals not in favour of the technology may resist efforts with EMIS. Researchers have noted that the continued commitment and support of leadership for technology impacts the level of use of that technology (Papaioannou and Charalambous, 2011; Kanna et al., 2012; Waxman et al., 2013). Moving beyond the limitations of situating EMIS in the HCI model would involve investigating cultural, technical and social factors influencing the level of support for the technology. In addition, the results from studies on HCI tend to point towards improvements in computer design rather than individual or organizational development.

3.1.3 Activity theory

Activity theory (AT) has significantly contributed to the discourses in education with regards to analysing educational practices (Martin and Peim, 2009). The theory focuses on interactions between the subject/s, the object, the collective activity, the system of rules in which the interactions take place, the stakeholders involved in the process and the outcomes (Engeström, 1999). The development of AT as a theoretical lens can be traced over three generations.

First generation

The first generation involves the arguments of Vygotsky (1981), who noted that humans' interaction with an object is indirect as it goes through a process of reconstruction based on the subject's contextual understanding of the object. Vygotsky (1986) proposed that knowledge in the real world is constructed through interaction. The process depicts a triad of interactions with the subject, object (objective) and tool (mediating artefacts). Vygotsky argued that thoughts could be processed to raise the awareness of mental activity and to

understand the sense of meaning formed by the subject (Vygotsky, 1986). Thus, the process of reconstruction is to regulate (and be regulated by) the work process and to regulate the subject in the process of work (Engeström, 1999). The arguments of the first generation activity theorists provide a framework for analysis but lack the complexities of human interactions (i.e. cultural and historical factors). According to Engeström (2001), the limitation of the first generation activity theory overlooked the contextual and collective impact on the subject actions.

Second generation

Second generation AT, also known as cultural historical activity theory (CHAT), is based predominantly on the work of Leontiev (1999) and Engeström (1999; 2001). It provides a more multi-dimensional approach to understanding human interaction with technology by connecting individual action to collective activity (Cole, 1996). Several levels of activity are noted: the first consists of collective activity which is guided by the object's orientation; the second consists of individual actions guided by goal orientation; and the third consists of operations guided by cultural tools. An activity system is noted that consists of cultural mediation, object oriented collective activity and goal oriented actions. For second generation activity theorists, individual activity exists in the form of collective action. Considerations are made for how human actions influence and are influenced by collective interactions. The introduction of cultural, historical and communal goal orientated action expanded the arguments of first generation activity theorists (Engeström, 2001). Since the object is socially reconstructed and directed towards a communal goal, the arguments of second generation CHAT seems to imply that the leadership perspective of EMIS is embedded in understanding the technology, activity with stakeholders and connected to the collective goal. Although

CHAT provides a distinction between individual action and collective activity, it undermines the macro influences impacting the activity system (Martin and Peim, 2009).

Third generation

The third generation of AT researchers attempted to address the macro influences impacting upon the system of activity by adding multiple interacting systems. In third generation CHAT, the activity system consists of a minimum of two interacting systems. This enables a focus on the changes that may or may not result as a new object is introduced into the system of activity. The object focused, tool constructing, collective goal and continuous development of the activity system comprise the basic principles of third generation activity theory (Engeström, 1999). In the first generation, knowledge exists as the subject reconstructs the object to form tools. In the second generation, knowledge exists in communal interactions. In the third generation, knowledge exists between the interacting activity systems.

Numerous empirical studies have used CHAT to investigate the impact of change in education (Jewitt, 2006; Somekh, 2006; Britto, 2007; Williams, 2008; Yamagata-Lynch, 2009, 2010; Hill, 2011; Stella, 2011; Clapham, 2011; Churchill, 2011; Bourke and McGee, 2012; Keengwe and Kang, 2013; Pryor and Crossouard, 2008). Clapham (2011) used CHAT as an analytical framework to investigate teachers' experiences with technology. He notes the usefulness of CHAT for understanding how technology mediates a reconstruction of an activity. What was seen as a small technological change had wide and unexpected consequences for the professional relationships between colleagues. Thus, he calls for education technology researchers to consider the impact of technology on the professional lives of its users. Williams (2008) used CHAT to investigate head-teachers' responses to a government policy. He noted how government initiatives that focus on school performance

mediate a culture of greater accountability for head-teachers and intensifies an 'audit culture' in the education system. This, he found, restricts the autonomy of the head-teacher and the opportunities to make responsive decisions.

As stated earlier, the researcher initially sought a model to explore the leadership perspective of EMIS. The researcher relied on his understanding of CHAT for the ability to theorize interactions with EMIS in the local context and actor's understandings of EMIS. The theoretical argument of CHAT enabled exploration on levels of goal oriented activity with the subject/s, the object, the system of rules in which the activity takes place, the stakeholders involved in the process and the outcomes (Engeström, 1999). For example, senior management's directive to use EMIS provided the rationale for principals to implement the technology in their school. This included identifying those who would take part and the activity that became priority. Despite the apparent influences of CHAT, limitations were noted. One such limitation involved the inability to fully theorize human behaviour as actors are contextualized by one common and isolated goal (Sellman, 2003). Contextualizing human behaviour overlooks the wider social and political influences impinging on their actions (Martin and Peim, 2009). These influences impact upon the leadership understandings and compete for the meaning. In addition, by focusing on the collective, CHAT encouraged generalizations about actors that undermined their activity in context. For example, the notions of power embedded in schools are under theorized (Martin and Peim, 2009). In addition, since this study focuses on the principals, analysing the communal goal orientation of EMIS proved to be problematic since principals activity could be motivated by personal interest. The arguments of CHAT poses that understanding EMIS would involve not only principals but also the community of actors, and this shifts the focus away from the phenomenon (i.e. leadership perspective) the research intends to investigate.

Initially, the researcher's thinking behind the use of models is that the frameworks would be used as thinking tools within which the leadership perspective of EMIS could be understood. The TAM influenced the researcher's thinking towards considerations for principals' understanding of how EMIS was used and how it enhanced their work. With a focus on the point where user and computer interact, HCI influenced the researchers' thinking towards considerations of the functionality of artefacts. The arguments of HCI prompted an analysis beyond the expected use of the technology by questioning actor's actual use of the technical infrastructure (i.e. computer, software and networking). Questioning the hands-on use of the technology seemed to provide insight into the areas in which EMIS impacted the role of the principal. CHAT influenced the researcher's assumptions with EMIS for focus toward the historical and cultural context, and for the different levels of activity (e.g. DoE level, school level and user level). The researcher's thinking shifted away from the use of models as considerations were made of the complexity associated with EMIS, leadership in schools, the principals' activity, the education policy and the Bahamian culture. In addition, the advice of seasoned researchers in the field also contributed to shifting the researcher's thinking and added new directions for situating EMIS in theoretical arguments of the social constructivist approach.

The next section discusses the social constructivist approach for exploring school leaders' experiences and EMIS, and how it is used for investigating principals' understandings.

3.1.4 The social constructivist view of EMIS

This section provides a social constructivist view of EMIS in order to highlight the importance of understanding the technology from the leadership perspective.

Considering the various ways of viewing technology, this study situates EMIS within a social constructivist approach. The complex dynamics of EMIS, school leadership and social interactions points to a theoretical construct that enables flexibility for technology to be analysed from the understandings of principals, and embedded within the social realities in which it is implemented (Bijker et al., 2012).

The social constructivist approach developed from a merging of social construction and constructivism (Bijker, 2010; Charmaz, 2008). Both approaches are radically different from the determinist view and are based on the premise that different explanations of reality exist and should contribute to the formation of knowledge. Whilst the constructivist view signalled a shift towards individual construction of knowledge, the social constructivist view extends the creation of knowledge into social structures (Bijker et al., 2012). With social construction, emphasis is placed on the shared approach (i.e. negotiation) to knowledge formation. The social actors, through their mental representations that become prevalent and reproduced in actions, are important to the meaning associated with EMIS. These actors have understanding that emerges from the complexity of working directly with the technology (Charmaz, 2008; Bijker, 2010). Social construction suggests interplay between social interactions and the various influences of the social context.

Constructivism places the individual as an active agent altering reality and constructing a subjectively meaningful reality through their sense making processes. Pivotal to this research, and the constructivist approach, is an understanding of reality from the individual perspective, i.e. the principal. Lakoff (in Kiraly, 2014) argues that such understanding is internal and acknowledges,

> *. . . that we are organisms functioning as part of reality and that it is impossible for us to ever stand outside it and take the stance of an observer with perfect knowledge, an observer with a God's eye point of view (Lakoff, 1987:261).*

The idea is that an understanding is needed from individual/s involved in the actual process. Two of the more common constructivist approaches include: radical and social constructivism (Bijker, 2010). With radical constructivism knowledge is an individual construction based on experiences. The underlying assumption is that knowledge is in the individual and emerges through individual reflection on personal experiences. From this view, knowledge exists in a closed cognitive system created and developed by the individual. Whilst radical constructivism focuses more on knowledge constructed based on individual thinking and reflecting on the world, the social constructivist focuses on knowledge based on social interaction within the social and cultural context. With social constructivism knowledge is bound to social context.

Authors (e.g. Walsham, 1995; Charmaz, 2008; Walker et al., 2008; Bijker, 2010; Kiraly, 2014) regard the social constructivist approach as a combination of meaning making and socially supported interactions, where the individual is an active agent involved in constructing meaning through self-conceiving and self-organizing processes, which are influenced by their own understandings of the world. The social constructivist approach suggests knowledge of EMIS is formed in the local context, there are different value-positions to consider, and a process of negotiation is required between stakeholders with multiple understandings. This view recognizes the principal as a self-determining agent but also reflects their social environment. It also recognizes that understanding of EMIS is situated in a complex system of schooling in The Bahamas that is multi-faceted with inconsistencies and contradictions. Thus, investigating the leadership perspective of EMIS

with the social constructivist approach acknowledges that each principal's understandings of EMIS are subjective and personally constructed, and thus, separating EMIS from these factors is not possible. The rich data provided from situating EMIS in this view gives the depth for an appropriate qualitative approach and research focus.

Recent studies involving EMIS have indicated the need for a social constructivist approach with the technology. For example, Iyengar et al., (2014) explore the Nigerian MDG information system to support data driven decision-making and planning at the local level. Implementing the web-based technology encountered several challenges, one of which related to developing the best presentation of the data developed by the technology. Although multiple consultations were conducted with various stakeholders, satisfying all the different views challenged the development of the technology. It became necessary for the leadership of the national office to move the technology beyond the challenges and for its continued developed. The findings of this study indicate that, although EMIS can be useful for education purposes at the local level, leadership is needed to make use of the different understandings and to effectively use the technology.

Positioning principals within the social constructivist view of EMIS

This research was designed to explore the understandings of principals, i.e. their knowledge, views, interpretations and their decisions with EMIS within their individual school. In a sense, researching principals' understanding refers to how EMIS is experienced by them in a way that makes sense to others in a different position. The intent is to communicate EMIS in a way that tailors a message of the contributions of leadership.

The social constructivist view of EMIS places principals in a pivotal role to support/hinder the technology by facilitating a collaborative environment and managing the interactions. On

a practical level, leadership with EMIS becomes more about ensuring the implementation process is carefully sequenced so that staff perform the necessary tasks and shape the responses of stakeholders using organizational procedures. This may involve providing appropriate materials and tasks, explicit instruction, questioning activity, collaborating with stakeholders, coaching staff and facilitating knowledge. Also, principals' involvement with EMIS may require them to be a resourceful leader to facilitate success with the technology. Edwards (2015) argues that being a resourceful leader involves coordinating motives and practices and communicating 'what matters'. Thus, as principals coordinate stakeholders' activities with EMIS they take control of the technology and objectify what matters to them. Since implementing EMIS involves change, the social constructivist view places the principal in a position that enables them to negotiate the changes to deal with the innovation that is going on around them.

The next section discusses empirical research of EMIS in developing countries.

3.2 EMIS in developing countries

Development of EMIS can be traced to the early 1960s in the United States where teachers designed and used a tailor-made technology for school use (Visscher et al., 1999). Over the years EMIS was adapted by business professionals to be used for financial and human resource applications. During the 1970-1980s development focused on school computer applications and clerical and administrative applications were noted in the school. By the mid 1980s modules were developed to support education management and required limited integration and support. Researchers have associated EMIS with attempts at improving education systems by modernizing the management of data, improving information flow and harnessing the potential of technology (Bhatti and Adnan, 2010; Lightfoot, 2014). This

section focuses on some of the relevant literature on EMIS in developing countries to highlight some of the leadership issues that impact upon the success/failure with the technology.

3.2.1 Leadership issues with EMIS in developing countries

In developing countries around the world practitioners and researchers have implemented and studied EMIS.A review of empirical studies in developing countries reveals that whilst some have described experiences with EMIS as a success (Voigts, 1999), the expectations of decision-makers seldom are realised(Bisaso et al., 2008; Bhatti and Adnan, 2010; Chitolie-Joseph, 2011; Mbalamula, 2014).

In the North West Frontier Province Bhatti et al. (2013) relied on a descriptive methodology to investigate the utilization of information generated by EMIS and the challenges experienced integrating this information into management practices. Data were collected through surveys and interviews with EMIS staff. An underlying assumption of this study was that data produced from EMIS could improve the working capacity of management and speed up the decision making process. This assumption is associated with the commonly held rationale that implementing EMIS would provide reliable and relevant school information to enhance decision making (Powell, 2006; Chitolie-Joseph, 2011).

Whilst the scope of the study is on a national rather than a local school level, the findings revealed that, although it was intended that EMIS had an important role in the planning and decision making process, implementing the technology challenged the decision making processes. It was revealed that collecting, processing and integrating information into EMIS increased the workload of staff responsible for data entry. The study notes that the information handling processes of decision-makers were challenged when sharing data

produced by EMIS. It was revealed that district officials obtained data by making requests to schools and the schools would then pass on the requested information once found. This research argues that, because data were collected and disseminated based on the expectations of users on one level, this resulted in inadequate data amongst users on another level.

This study challenges assumptions that EMIS can readily perform administrative functions in a way that provides timely, reliable and accurate data for decision-makers to perform their responsibilities efficiently. In this study several leadership issues are noted with EMIS. The first is that although having adequate technical infrastructure is important for the functionality of the technology, it still requires leadership for on-going maintenance and technical expertise. Secondly, there are different information users in the education system. Thus, users at the national office may require different information from the users in the school. Hence, leaders are left with the challenges of identifying and coordinating the appropriate information from EMIS and ensuring it is made available to the relevant user. Finally, the quick information handling of EMIS does not always align with existing organizational processes and policies. It was noted that slow decision making is a common trait of the bureaucratic education system. Thus, implementing EMIS may challenge how information is handled by leadership with regards to making decision.

In Botswana and Uganda, Bisaso et al. (2008) investigated the use of information produced in EMIS. The study reported that Uganda respondents found EMIS useful for several work areas that included providing insight into how the school functions, improving the utilization of school resources, and improving workload. Although the respondents provided positive responses, many were not satisfied with the level at which the technology was used in the school. This, researchers argued, was due to the fact that the technology did not provide the information users felt was needed. The study also reported that EMIS users relied heavily

upon the leadership of the administrator to provide technical support, without which the continued use of the technology was stagnant.

The study on EMIS in Botswana did not reflect the same level of use, and this was attributed to the fact that the primary reason for the technology was to manage information on the growing teacher population. Decision-makers expected EMIS to improve the management of personnel records, service delivery and the decision making processes. However, the study did report that the Botswana respondents felt that the technology was useful for managing the transfer of teachers, reducing errors when posting new teachers and processing gratuity payments for expatriate teachers. It was also reported that the least useful aspects of the technology included reducing workload and processing teacher employment benefits. This, the study concluded, was the result of staff members having to use the technology in addition to their existing workload. A member of the research team observed that EMIS was not switched on by most users at the local site and this prompted concern that external users had a greater interest in the technology than the local users. This observation seems to support the arguments that attribute the primary drive for the implementation of EMIS to senior management and international donors (Chapman, 1991).

The findings of both countries reveal that although EMIS is recognised for its potential support to the educational system, the expectations for the technology is seldom realized, the technology is often underutilized and leadership is needed for users to move beyond the challenges associated with using the technology. In Uganda the underutilization was attributed to the lack of training and support for EMIS leader, i.e. the administrator. Even after five years of use, the technology in Botswana was still being used in an ad hoc manner.

When investigating mobile supported e-government systems in Tanzania, Wicander (2011) used a case study approach to analyse EMIS as a means to faster, more reliable and less resource demanding data transfer. His findings revealed that the collection, distribution and submission of data produced by EMIS was resource consuming and subjected to the organizational processes that negatively impacted the data handling procedures. The study also found that data produced by EMIS were embedded in the knowledge of languages, and thus, the multi-lingual context posed problems for transferring data and restricted the use of the technology. One aspect of leadership noted in his study was the attitude of leaders toward the technology, particularly with regards to handling technical challenges. Despite the scarcity of financial resources, technical infrastructure and unstable organizational structures to implement EMIS, leaders at the school level showed a high intention to make use of the technology despite the existing challenges associated with the technology. In essence, the attitude of leaders became the underlying source supporting EMIS.

In St Lucia, another Caribbean county, Chitolie-Joseph (2011) examined EMIS with the intent of understanding how the technology was being used at the school level, and what was required to facilitate its use. She noted that the handling of technical, personal and organizational factors contributed to the limited use of EMIS. The findings revealed that, although EMIS was supported in principle, the implementation of the technology was embedded in leadership. This means that without leadership EMIS was dormant. For example, leadership was noted in what Rogers (2003) describes as the ‘champion’ who took personal responsibility to facilitate the implementation of EMIS by maintaining dated computers and working additional hours. When this leader was dismissed from the education system, all plans with EMIS in the school were placed on hold. As the school attempted to use EMIS in the absence of their initial ‘champion’, they relied on the leadership of the MoE to assist with

technical problems. This reliance further heightened the agency of the MoE over the school's practices and new ways of working with the technology evolved. Thus, in the absence of the initial locally based technology leader the school recognised specific activities that kept EMIS operational. With the new technology leadership based at the MoE, new activities emerged with EMIS that resulted in the school having less control over their work.

One of the more successful attempts with EMIS was noted in the work that Voigts (1999) conducted in Namibia. The aim of his study was to examine the trend in utilizing the information handling capacity of EMIS and highlight the development of the technology in the country. Voigts (1999) attributed the success of Namibia to the continued support from senior level leadership. This support cultivated an environment where EMIS was accepted and backed-up, even when change on key parts of the education system was needed to adjust work practices. Also EMIS team that provided leadership for the technology had high levels of freedom that enabled the team to have agency when implementing their ideas and be innovative to support EMIS through critical discussions with colleagues. His study shows the importance of a leadership strategy when implementing EMIS. Such a strategy includes assessing the data needs of the MoE and training the team to manage the technology. This study highlights that EMIS is associated with support from senior levels and that the primary reason for having EMIS emerges from senior levels.

A review of the above empirical literature on EMIS in developing countries reveals a need to investigate the leadership perspective of the technology. Such a focus would provide insights on how the countries might be more successful with EMIS and the contributions that the technology offers to their education system. Also, insight can be provided into the challenges associated with many of the unsuccessful attempts with EMIS.

3.3 Conceptualizing leadership in schools

This study adopts a social constructivist approach for understanding EMIS with regards to the leadership perspective, and this warrants discussions of how leadership is understood in schools. This section discusses different types of leadership in schools and present arguments for principals as the focal point of understanding the leadership perspective of technology in schools.

The concepts of leadership extend historically through generations of research. Although there is a lack of consensus on the definition of school leadership, there is a consistent view of leadership in schools being bonded to organizational structures and to a privileged site of influence (Leithwood et al., 2006; Bush, 2008; Northouse, 2014). An understanding of leadership in schools involves recognition of both the position of leadership, which is associated with organizational structures, and the practice of leadership, which is associated with interactions (Fullan, 2001). This conceptualization is consistent with the social constructivist view and useful for allowing focus to be placed on the social aspects of the organization while considering individual contributions.

Some educational researchers recognise the bond of leadership to organizational structures and call for a separation (Hatcher, 2005; Gunter, 2001). Separation of this sort allows leadership to be experienced in a non-hierarchical setting with shared responsibilities (Everard et al., 2004; Oduro, 2004). It also allows leadership in schools to be understood beyond managerial notions (Gilchrist, 2003; Watts, 2011; Moyo, 2010) and more inclusive of understandings that focus more on context (Close and Raynor, 2010; Spillane and Healey, 2010). From this view, leadership in school becomes more inclusive (Osman and Mukuma,

2013), allowing the concept to be analysed beyond the common indicators such as qualifications and years of experience (Hudson, 2012).

3.3.1 Types of school leadership

Some of the more common types of school leadership associated with a shared experience include: distributive, collaborative and team leadership. These types of leadership acknowledge organizational structure and the influence existing in the individual action (Vennebo and Ottesen, 2012). These types of leadership also have the same notion of influence not being confined to 'the monopoly of one person' (Oduro, 2004:5). This is particularly important since the leadership in school is experienced through the involvement of staff members and other stakeholders (Oved, 2005; Chikwa, 2012; Cudanov and Jako, 2012).

The researcher's rationale for discussing the types of leadership is to grasp the approaches principals may or may not adopt with EMIS. Since much of what takes place in principals' day-to-day work occurs outside the written formal organizational roles (Weinstein and Munoz, 2013), the researcher intends to find out how and if principals draw upon a particular type of leadership to work with EMIS. Distributive, collaborative and team leadership are discussed further below.

Distributive leadership

Spillane (2012) describes distributed leadership as being stretched over multiple individuals. For him, distributed leadership is based on leadership as a collective rather than an individual. In this sense, incidences of leadership in schools occur amongst principals, administrative staff, classroom teachers and other stakeholders.

In an empirical study, Moyo (2010) investigated principals' understandings on the effects of distributed leadership. His findings revealed that principals perceive distributed leadership as having a positive contribution to the improvement in student learning. His findings also revealed that distributed leadership contributes to a more participative form of leadership since staff members are involved in decision making. He argued that distributed leadership flourishes where there is collaboration, involvement of stakeholders and collective decision-making.

Critics of distributed leadership caution about its effectiveness in leadership practices (Hartley, 2009). Woods (2004) argued that although distributed leadership appear to incorporate sharing of leadership, in reality the 'distribution' of leadership occurs through organizational structures. Thus, the sharing of leadership is endorsed through organizational positions, and that the 'top-down' and 'leader-follower' interaction is still dominant (Gunter and Rayner 2007). In this sense, a contradiction exists between distributed leadership claims of democratic procedures and continued centralized control (Hatcher, 2005). In regards to this study, this seems to imply that although staff members may have leadership responsibilities with EMIS distributed to them, the selection of staff and distribution of responsibilities are subjected to the decisions of the principal.

Collaborative leadership

Hallinger and Peck (2010b) describes collaborative leadership based on a school wide focus on activity shared among stakeholders. Their study investigated the impact of collaborative leadership on school improvement over a four year period. Their findings indicated that collaborative leadership had a positive impact of on students' academic achievement. The study argues for leadership to be viewed as a process of mutual influence.

In another study, Hallinger and Peck (2010a) assessed the impact of collaborative leadership on school improvement based on teachers' perceptions of leadership processes. The aim was to understand how collaborative leadership contributes to school improvement. The primary areas of collaborative leadership were decision making, commitment and participation. They noted that a relationship between leadership and student learning was formed where changes in collaborative leadership positively impacted upon school improvement, and changes in school improvement positively impacted upon student learning. Their findings highlight the complexity and interconnectedness of leadership understandings and school improvement. The findings also indicate that not all decision making in schools occur collaboratively.

Perhaps this is why Larusdottir (2008) linked the collaborative leadership to 'women's way of leading', where qualities of caring, inclusiveness, nurturing, openness and intuition are emphasized. She argues that with women leaders the hierarchy is flattened by emphasis on power sharing, caring and learning. She continues that there is a strong focus on sameness in their way of seeing, knowing and organizing. Whilst her study adopted a feminist approach to study the values of head teachers, her findings highlighted that both men and women favour approaches to leadership that emphasize values of care, cooperation and consultative approaches and relationships.

One of the criticisms of the collaborative approach is the assumption that it will result in a better process or solution (Owain and Grint, 2013). Developing shared leadership is a difficult for some leaders who may find that making solitary decisions are more favourable than the difficulties of collaborative leadership (Sims, 2011). Another assumption is that collaborative leadership activity will be better, which is not always the case when group members' activity is not complementary (Gilchrist, 2003; Coleman, 2012).

Team leadership

Teams are useful in organizations for setting goals, coordinating resources and executing tasks (Burke et al., 2011). Burke et al. (2011:338) views team leadership as a behavioural process that facilitates development of a group of leaders, and involves the activity and interactions that promote effective teamwork. Northouse (2007) identifies principles for implementing effective teams, these include having clear goals, being results driven, having a climate of honesty, openness and respect, having external support and recognition, and having the necessary resources to carry out the required tasks. He argues that leaders influence teams by helping the team to understand the problems, by uniting the team, by helping the team to cope with difficult situations, and by providing clear objectives.

The team approach has some problems. For example, a team member may exploit the situation to protect their own interests at the expense of the overall goal (Hargreaves and Fink, 2006). Similarly, team members can also create barriers to effective teamwork. This is echoed by Chen et al. (2004) who note that the behaviour of some individuals can frustrate teamwork and render it ineffective. Team leadership can also be problematic when some team members receive extra money for work activities and others receive nothing (Spillane and Camburn, 2006). With regards to EMIS, the arguments from the literature suggest that principals have an important role in ensuring the effectiveness of teams (Chen et al., 2004; Hauge et al., 2014), and that principals must find ways to overcome the undesirable behaviours that are ingrained in both individual and collective behaviour.

The leadership discussion, thus far, suggests that principals have a willingness to share leadership responsibilities. A common contradiction among the sharing of leadership involves the fact that principals occupy a dominant position in the power structure and studies

reveal that they are reluctant, at certain times, to share power (Blase, 2004; Danielson, 2006).This implies that shared leadership can only be realised when, or if, it is endorsed by the authority of the principal. Hatcher (2005) affirms this argument by concluding that in schools, leadership is delegated and exercised on behalf of the institutionalized authority.

Although not directly associated with shared leadership, two of the common types of leadership noted in Bahamian schools include instructional and spiritual leadership.

Instructional leadership

Instructional leadership involves stakeholders' interaction with the school's instructional programme to facilitate decision making and school improvement (Osman and Mukuma, 2013). It separates itself from other forms of leadership by focusing on the curriculum and teaching and learning processes (Bush, 2014). The focus of the principal tends to be on the teaching and learning practices to facilitate improvement in student examination scores (Ruff and Shoho, 2005). Instructional leadership, with the emphasis on improving the instructional programme, has a strong association with teaching and learning practices in the school (Bowers, 2009; Goldring et al., 2009; Halverson and Clifford, 2013; Loock, 2014).

Rigby (2014) investigated the beliefs, norms and routines associated with instructional leadership. She argued that, although the focus of instructional leadership is primarily on increasing student achievement, it lacks clarity as to the meaning of key terms (e.g. learning, instruction or achievement) and the mechanisms through which improvements are to be achieved. Hallinger and Lee (2014) relied on two frameworks to investigate the role of the principal as instructional leader in Thailand as government reform attempted to change school management practices associated with teaching and learning. One framework is based on three broad categories that shape principals' leadership practice. These include: personal

characteristics; institutional and communal context; and setting direction. The other framework relies on a rating scale[20] with three categories: defining the school goals, managing the instructional programme and developing a learning climate in the school. Even though reform efforts sought to improve the quality of education through changes in the teaching and learning practices, the findings revealed that principals' leadership practices remained predominantly unchanged. This, they argue, is partly due to the institutional context where principals as civil servants face difficulty within the hierarchal centralized education system when operating instructional leadership.

This study highlights the complexity of using instructional leadership in the school. In addressing the complexity of the school, Neumerski (2012) emphasizes a focus on the interaction of leadership in context. She argues for an approach to instructional leadership developed around integration and cohesion. Such a focus, she continues, uses context to understand moments where instructional leadership could facilitate learning. In another study investigating instructional supervision in public schools in Kenya, Wanzare (2011) noted that although instructional leadership was intended to focus on teaching and learning in the school, it was used as a tool to check the work of staff members to ensure alignment with organizational regulations and procedures. In this sense, it facilitated loyalty to senior decision-makers and reinforced bureaucratic controls.

In regards to this study, instructional leadership offers insight to the perceptions principal may have for EMIS. For principals, EMIS might offer points of contention for placing emphasis on teaching and learning. Principals with a strong instructional leadership may view EMIS in regards to improving the teaching and learning process.

[20] See Hallinger, 1982 and Hallinger and Murphy 1985.

Spiritual leadership

Researchers argue that traditional approaches to leadership have focused on the physical, mental and emotional aspects of individual activity and overlooked the spiritual component (Fry, 2003, 2005; Bush, 2010). Bush (2010) described this oversight as 'dissatisfaction with the dominant rational-bureaucratic assumptions about leadership'. Spiritual leadership has been commonly referred to as values that promote 'transcendence' through work process whilst facilitating a sense of completeness and fulfilment (Krishnakumar et al., 2014). In essence a sense of spirituality heightens the leadership focus towards interconnectedness (Krishnakumar et al., 2014). In this sense, spiritual leadership represents an approach to leadership that reflects the way in which principals operate in the world, i.e. work with EMIS.

Howarth (2011) relied on case study methodology to investigate the spiritual dimensions of head teachers. He notes that spirituality enables leaders to continue in the face of adversity and in the demands of leadership, and that it is connected to the pursuit of truth, social justice and community. For Howarth, spirituality seems to be linked to values that develop individual commitment to meaningful work. His notion of spiritual leadership seems to view leadership in regards to values that facilitate harmony within the organization and foster higher levels of commitment and productivity. Fry (2003) argues that having a 'calling'[21] for work is foundational for workplace spirituality. Fry's notion of spiritual leadership is different from Howarth's notion since it seems to be more of a motivation that directs an individual to work rather than a guide for work. Thompson (2013) investigated the contribution of spiritual leadership to the school and notes that spiritual leaders are known for

[21] For Fry (2003) calling is a sense of transcendence or making a difference through service to others, out of which meaning and purpose in life are derived. Professionally, it involves selfless service and an obligation to maintain quality standards, dedication and a strong commitment to 'the work'

their loyalty and cultivation of stakeholders' respect. He argues that spiritual leaders tend to see themselves as change agents and have high levels of commit to their schools. This commitment may be noted in their willingness to partner with external networks in order to bring about the desired success (Thompson, 2013). One of the challenges of spiritual leadership is that it causes focus be placed inward on personal value. However, leadership rooted within a system of personal values may lead to narcissism (Krishnakumar et al., 2014), particularly when individual values do not align with that of the organization. Also, acts such as seduction, manipulation and subjugation facilitate employee's disengagement have often been associated with spiritual leadership (Grant et al., 2004; Lips-Wiersma et al., 2009).

Principals have important responsibilities for the leadership of schools, and this leadership must be shared in order for principals to cope with the vast amount of changes occurring in schools (Fullan, 2010). This means that the relationship between the principal and stakeholder requires opportunities for others to contribute so that the desired changes are achieved. This atmosphere of sharing further supports the degree of success/failure experienced with EMIS.As leadership engages with EMIS conflicts are expected (Engeström, 1999). Salaman and Storey (2002) draw attention to a conflict associated with leading technology, that is, on one hand there is a need for control, coherence and coordination but on the other hand, there is a need for exploration. These factors are further exaggerated when the technology is used at the administrative level in the school. As principals engage with EMIS, focus is placed on their leadership role as they come to terms with the change.

One common mind-set of leadership involves what Congram (2013) associates with mind-sets that narrowly associate leadership with traditional unidirectional roles. Whilst an abundance of leadership types exists in schools this study considers Hackman and Wageman (2005) caution against demarcating the leader into a specific type. This implies that the

leadership of principals with EMIS is not fixed on a particular type of leadership, and principals are able to use multiple types of leadership at the same time.

3.4 The principal as technology leader

Schools have been commonly recognised as a place for preserving and transmitting cultural information (Regina, 2011). Bush et al. (2003) described the school work place as being hierarchical with power, privilege and status, but without the rights of autonomy that generally accompany hierarchical structures. In the midst of these conditions, principals are faced with the leadership of EMIS in their school. Introducing new technology into school challenges the norms in the school work place, particularly when it threatens the loss of power (Kling, 1996).

This study privileges the views of principals. Researchers recognise the principal as the primary individual for leadership in schools, particularly since the position is given through organizational authority and fits within the upper level of the organization's hierarchy (Cheng, 1994; Telem, 2001; Baek et al., 2008; Moolenaar et al., 2010; Starr, 2011). For some researchers the leadership of the principal is contested (Leithwood et al., 2006; Horn and Little, 2010; Sipilia, 2013). One argument places focus of leadership on the student (Harris et al., 2013), another places focus on the teacher (Hudson, 2012; Fairman and Mackenzie, 2014) while yet another focuses on the collaborative approach (Eddy Spicer, 2013). Whilst researchers represent different foci and sources of influence in the school, the position of the principal involves helping stakeholders to understand and accept certain responsibilities (Fairhurst, 2007; Clegg et al., 2008; Currie et al., 2009). The school stakeholders depend on the principal to establish a working culture to facilitate the pursuit of the school's goals (Bottery, 2007; Seneca, 2008; Moolenaar et al., 2010; Starr, 2011).

The principal is commonly recognised as the focal point for leadership with the implementation of technology (Afshari et al., 2010; Sharija and Watters, 2012; Kanna et al., 2012). Some studies focus on the qualities of the leader (Seneca, 2008), whilst others focus on leader strategies (i.e. managing stakeholders, staff, vision, resources and culture) (Mijinyawa, 2008; Blignaut, et al., 2010; Chikwa 2012). Given the desire to succeed, principals employ various leadership strategies when implementing technology.

Seneca (2008) examined the skills principals considered necessary to become an effective technology leader. The aim was to understand principals' views with regards to technology leadership in order to develop a professional development course. Her findings revealed that whilst principals recognised the importance of having a shared vision for implementing technology, that reality was confronted by the challenges brought by the technology itself. Her findings revealed that in the process of implementing technology into the school, principals realised that changes in the overall practices of the school were needed. This included changes in the practices used for student learning, school improvement and approaches to teaching. Her study findings also noted that the level of change needed to support the implementation posed challenges that caused leaders to reach beyond their comfort zones, which they were not prepared or had the resources to do. Her study offered the following contributions to principals as technology leaders which include: 1) having a clear vision of how to resource the technology in relation to school goals; 2) showing commitment to what is important technologically; 3) using the technology to inform decisions; and 4) understanding the issues of privacy and security and their impact on the overall operations of the school. Similarly, when investigating the leadership strategies of two principals implementing a technology, Makhanu (2010) noted setting direction, building collaboration, principal agency and staff development as key areas.

Principals' leadership is recognised as a focal point for the use of technology in schools. Several areas have been noted repeatedly throughout the empirical literature for being associated with the principal technology leadership: these include vision, attitude, training, infrastructure and commitment (Afshari et al., 2010; Makhanu, 2010; Buabeng-Andoh, 2012; Hiltz and Dexter, 2012; Razzak, 2012; Gottwig, 2013; Kanna et al., 2012; Mingaine, 2013a, 2013b; Sheppard and Brown, 2013; Sincar, 2013; Waxman et al., 2013). These areas act as potential key areas of responsibilities for principals with EMIS. Hence, they are discussed below.

3.4.1 Leading the vision

A vision for technology in schools has been recognised as an important responsibility for principals (Hiltz et al., 2012; Sincar, 2013; Sheppard and Brown, 2013). The success with EMIS depends a great deal on stakeholders support (Voigts, 1999). It is essential for stakeholders to have a clear understanding of how EMIS contributes to the overall aim of the school (Wicander, 2011; Effah and Osei-Owusu, 2013). This understanding is communicated through principals' interactions with stakeholders and involves constructing common understandings of what is to be done (Voigts, 1999; Creighton, 2003). Constructing this sort of understanding, Bridges (2003) argues, is done by focusing on principals' views of EMIS and interactions with stakeholders. It is the responsibility of the principal to communicate how EMIS can benefit the school so that the appropriate practices can be developed and supported (Spillane and Camburn, 2006; Burke et al., 2011). Moolenaar et al. (2010) places the principal at the fore-front of technology implementation. This position, he argues, is accomplished by the principals' activity in gathering support for their vision, by making requests to stakeholders, by clarifying how the technology should be used, by reflecting

ideals, by giving encouragement and by establishing standards. This position at the fore-front is a powerful tool in the hands of principals to construct common understandings of the technology in their school (Gill, 2009; Watson and Watson, 2011; Fu, 2013).

Researchers have associated technology failure with the lack of clear vision (Al-Khouri, 2007). For example, failure was associated with the absence of a common understanding of the purpose of the technology between practitioners and senior levels (Chitolie-Joseph, 2011). In another study, failure was associated with conflicting visions (i.e. the technology vision being at odds with the pedagogical vision) (Blignaut et al., 2010). Failure was also found to be associated with what Graves (1995) describes as an imaginative view of the technology that emerges out of reflections on the benefits of the technology itself. He notes that when technology is detached from common understanding of its intended use, it becomes a manipulative tool to impact practices and to align processes in the organization.

3.4.2 Modelling the attitude

The attitude of leaders is recognised as a critical factor when implementing technology into schools (Voigts, 1999; Seneca, 2008). Principals' attitude reflects their interest and motivation with EMIS, which may impact on how the technology is implemented. Also, principals' attitude provides the basis upon which activities are coordinated and act as a sign to stakeholders of the importance of the implementation (Gray, 2011). School staff tend to have a pragmatic view with technology and tend to regard it as negative or positive, favourable or unfavourable based on principals attitude (Piatt, 2006; Whalley, 2011). As technology leader, principals' responsibility involves having an enthusiastic attitude while considering the impact of this on stakeholders' attitude (Bisaso et al., 2008). As attitudes are modelled, an atmosphere is developed in the school that supports the use of EMIS (Shariff,

2002; Wako, 2003; Wicander, 2011). An attitude that supports EMIS involves understanding that interactions with the technology, staff and organizational processes are translated into the school. EMIS becomes less effective with opposing attitudes on how the technology might work.

Papaioannou and Charalambous, (2011) investigated principals' attitudes toward technology implementation and notes several areas in which principals attitude toward technology could be identified. These include: anxiety, avoidance and aversion; self-efficacy and confidence; and enthusiasm and enjoyment. The study highlights the importance of principals' attitude where EMIS is concerned since their confidence, enthusiasm, and commitment towards the technology and implementation have a significant impact on how challenges are handled (Papaioannou and Charalambous, 2011).

In Malaysia, Kanna et al. (2012) notes that the most common leadership strategy on which principals relies model the use of technology. The researchers argue that when principals show staff members' the appropriate attitude with technology, staff members would follow their lead. Although descriptions of a 'good leader' were not identified, the findings reveal that staff members are more actively involved with technology initiatives when 'good leadership' about the technology from the principal is perceived by staff members. The study emphasizes the need for principals to show better leadership with technology by modelling the use of technology and suggests that when principals realise their role as technology leader staff members are inspired to become more active in the use of technology.

3.4.3 Acquiring adequate training

Studies point to the lack of training among leaders to improve the school with technology (Creighton, 2003; Shuldman, 2004; Bisaso et al., 2008; Visscher et al., 2008; Seneca, 2008).

Principals' training in technology is important for supporting the day-to-day use of that technology and for accomplishing the overall goal with the technology (Dawson and Rakes, 2003). Principals are seldom provided with training that will enable the continued utilization of the technology features (Creighton, 2003). In general, principals gain their knowledge of technology informally, i.e. through observation (Visscher et al., 2008). Flanagan and Jacobsen (2003) call for adequate, on-going and intensive training for principals. This sort of training helps principals understand the difficulties they must face when leading technology and develop strategies for addressing them (Visscher et al., 1999). Thus, through training principals are able to gain an understanding of how to use technology to enhance traditional practices and to be creative in how the technology is used to meet the needs of the school (Visscher et al., 2008; Fu, 2013). The implementation of EMIS in schools involves many challenges which point to the need for principals to have training and support as opposed to staff members. Dawson et al. (2003) echoes this point by arguing that, in situations where staff take the initiative to get training, successful use of the training is unlikely without the support of principals.

3.4.4 Maintaining the infrastructure

In order to realise success with EMIS, a proper infrastructure is regarded as a precondition (Chapman, 1991). Having an adequate computing environment, that is, proper networking, functional computers, server capacity and ongoing maintenance is essential (Bhatti and Adnan, 2010). Also associated with a proper infrastructure is the technical support which is found to have a direct impact on the use of technology (Williams et al., 2000; Bisaso et al., 2008; Bhatti and Adnan, 2010; Chitolie-Joseph, 2011; Bass, 2010; Stella, 2011; Chikwa, 2012). This means that leading technology in the school requires that principals have access

to technical support (Blignaut et al., 2010). Principals can rely on technical support for maintenance of the infrastructure and for the technical knowledge to guide their decisions for aligning EMIS and school practices (Chitolie-Joseph, 2011). In addition, principals need to feel confident in their ability to lead EMIS, because facing technical problems induces feelings of insecurity (Prokopiadou, 2012). Thus, access to technical knowledge is essential so that principals are able to overcome apprehension associated with the technical aspects of EMIS.

3.4.5 Managing stakeholders relations

A part of principals' responsibility with EMIS involves interacting purposefully with stakeholders. Interacting with stakeholders is a form of relationship management that facilitates stakeholders' involvement (Hallinger and Heck, 2010; Moyo, 2010; Burke et al., 2011; Spillane, 2012). Edwards (2005, 2010) argues that in addition to drawing upon their own expertise, effective practitioners utilize the expert knowledge found in others. Her notion of 'relational agency' is a call for collaboration and a way for principals to engage in what stakeholders have to offer. The move from traditional practices to practices that embrace new concepts requires commitment (Moser, 2007). Principals' interaction with stakeholders is a valuable resource for the commitment needed with EMIS.

According to Oreg (2003, 2006), certain individuals have a tendency to resist and devalue the efforts of leaders. Two actors are noted for their direct influence with regards to the implementation of technology; these include the opinion leaders and the champion. The opinion leaders are actors with strong connections who use their understanding to influence other stakeholder (Rogers, 2004; Trepte and Scherer, 2010). Principals' interactions with the opinion leaders are critical when introducing new processes to the school. A charismatic

individual, the champion, uses their experience and expertise to support change (Rogers, 2003). The champion is proactive in involving others by sharing their enthusiasm and passion for the technology (Stuart et al., 2009). Their actions are described as being supportive, particularly to overcome resistance and promote innovation (Beath, 1991; Parr and Shanks, 2000; Neufeld et al., 2007). Both the opinion leader and the champion play a key role in supporting the implementation of technology and are able to influence the successful implementation of technology (Howell, 2005; Mingaine, 2013a, 2013b). The importance of key actors is noted for their influence on principals' leadership efforts. The relationship that the principal develops with these key individuals is important to their leadership with EMIS.

3.5 Summary and research questions

This chapter has discussed EMIS in relation to leadership. It argues for a social constructivist view of EMIS and sets its boundaries within developing countries. It also discussed the types of leadership in schools that principals may draw from to support EMIS. The discussion of principals as technology leaders highlights key areas of responsibilities for principals with regards to EMIS. The review of literature also discussed principals as technology leaders. This shed light on how principals use their leadership to facilitate change within the wider school community to support or hinder EMIS. The social constructivist view enables the study to situate EMIS in the understandings of principals and be explored within the school, leadership and cultural contexts. The first research question is therefore:

RQ1: *What are the principals' experiences of understanding of implementing EMIS in their school*?

The literature review on EMIS in developing countries looked at EMIS in countries of similar context to that of The Bahamas. The aim was to highlight the how and where countries are

experiencing EMIS and the leadership issues associated with its implementation. Thus, this literature review aimed to help understand the second research question, which is:

RQ2: *What are the principals' understandings of the contributions of EMIS to the school*?

Each of these questions is addressed in the findings chapters, 5 and 6.

CHAPTER 4: METHODOLOGY

This chapter reviews the methodological approach used in this study. The chapter begins by outlining the approach to research and how the researcher's epistemological and ontological understanding of the process warrants a technique that relies on the case study approach. The chapter then outlines the data collection, study sample, data analysis and pilot study. Thereafter it discusses issues of validity, reliability, and ethical concerns. Finally, the limitations of this study are considered.

4.1 The researcher's philosophical position

Epistemological beliefs about what can be known are linked to ontological beliefs about the nature of the world. Punch (2003) distinguishes between epistemology and ontology.

> *Ontology refers to what exist in the world, to the nature of reality: what is the form and nature of reality? Epistemology refers to the nature of knowledge claims, and to the question of what counts as knowledge: what is the relationship between the knower and the known? (Punch, 2003:170)*

The theory of knowledge as a foundational part of this research requires the researcher to address the questions, what is knowledge and where is it found. The knowledge that emerges in this research is dependent on the approach used by the researcher, the participants and the technology under study. The subjectivist approach to knowledge suggests that knowledge is based on experience and insight of a personal nature (Burrell and Morgan, 1979:2). On the other hand objectivism suggests that knowledge is hard, objective and tangible (Cohen et al., 2011). This study deals with principals' views and understandings of EMIS, which suggests a subjectivist approach. With this approach to knowledge, the leadership perspective of EMIS is constructed through a process of negotiation and interaction.

The ontology associated with exploring understandings with EMIS involves inquiry into how individuals make meaning of their experience. Inquiry of this sort seeks to identify and account for situations that enable principals to construct meaning in the world in which they live. A belief fundamental to this research is that principals are able to give meaning to their life. Such meaning may be subjective but at some point it animates as well as emanates from individual understanding. A phenomenological stance supports this research in that it suggests that individual understandings are based on human interactions and that knowledge can be derived from descriptions of the phenomena (Svensson, 1997). Such an approach to knowledge is underpinned by the social constructivist principle as meanings of phenomena are constructed from an array of social and personal influences (Bijker et al., 2012). A key point of the social constructivist epistemology is that social reality does not exist independent of human involvement, and thus, meaning is constructed through interactions (Bijker, 2010).

The leadership perspective could be understood by asking probing questions about principals' professional practice. Their descriptions and insights allow their personal understandings to be analysed. Charmaz (2008) points out that interpretation of social reality have meaning only in particular historical, social and cultural contexts. Thus, the leadership perspective of EMIS would be influenced by technical, organizational, cultural and political aspects, as well as, individual attitudes, norms and values. This means that principals interpret and apply particular methods for how EMIS is used. This process, however, is not mechanically applied. Instead, it is a process that needs to be interpreted socially, culturally and technically.

In order to investigate the leadership perspective of EMIS a social constructivist approach is taken to enable considerations of the complex context within which principals work (Walker et al., 2008). With this approach, knowledge of reality can be gained through inquiry into common meanings (Walsham, 1995). Included are notions of retelling principals' experiences,

the existence of multiple social realities, recognition of mutual creation of knowledge and an interpretive understanding of subjects' meanings' (Lincoln and Guba, 1985; Schwandt, 2000). In doing so, objectivist notions are rejected since they ignore the role of social relationships and cultural contexts.

4.2 Methodological approach

This study seeks to investigate the understandings of principals; therefore, a method of inquiry is needed that enables the researcher to make sense of the settings where leaders make sense of EMIS. Thus, a qualitative inquiry is adopted that considers individual/s understandings of events to describe their meaning of social reality (Creswell, 2007). Yin (2013) notes that qualitative studies are the preferred strategy when focusing on a phenomenon, and when the researcher has little control over what a participant may input into the research. Compared to quantitative research, qualitative research is considered to be much more flexible as it permits the researcher to get close to the participants and understand the world from their experiences. Bryman (2004) recognizes that the benefit of qualitative research is the ability to reveal the experiences of a participant, as well as the ability to explore perspectives in a more `holistic' way. Researchers recognise the appropriateness of the qualitative approach, particularly when quantitative measures are not adequate to describe or interpret a situation (Bryman, 2004; Yin, 2013).

4.3 The case study approach

The concept ‘case study’ has multiple aims, one of which is to discover and document what might happen in a particular situation. Yin (2013) describes case study as an investigation into a phenomenon within its real life context. Silverman (2006) points to two attributes of case study research. Firstly, each case will be a case of something the researcher is interested

in. Secondly, case study seeks to preserve the integrity and wholeness of the case by focusing on specific features.

Yin (2009) identifies several types of case study based on the method of investigation. These include descriptive, exploratory and explanatory. Descriptive studies aim to portray an accurate profile of a person, an event or a situation and require background information regarding the phenomenon. Exploratory studies aim to find out what is happening, to seek insights into a situation or to assess a phenomenon under a new light. Exploratory studies involve conducting some fieldwork and collecting data prior to identifying the research questions. Yin argues for the explanatory case study approach when seeking an explanation of an event or a problematic situation.

Taking into consideration these case study designs, this study is explanatory since it seeks to understand EMIS from a particular perspective. This design enables explanation to be given about how principals' understandings function to produce knowledge within context (Yin, 2009). Since human relations are context dependent, Flyvbjerg (2006) recognizes the case study as a way for researchers to develop their skill. He also argues for the case study approach to research because it enables the researcher to engage with the subjects and get feedback from them in a way that avoids over generalizations. Thus, the case study becomes a crucial element in the analysis of data and in the interpretation of findings.

Considering these attributes, this research case study focuses on investigating the leadership perspective of EMIS in The Bahamas. Embedded within this case study are six principals' understandings of EMIS in their school.

4.4 Positionality

As a common practice in social research, the positionality of the researcher needs to be made explicit. Thus this section highlights the positionality of the researcher with regards to this research study.

Sikes (2004:18) recognizes positionality as the stance a researcher adopts. He argues that positionality reveals the researcher's philosophical position and fundamental assumptions concerning reality and the nature of knowledge. Several factors contribute to these assumptions including culture, geographical location, personal interest and disciplinary background (Wellington et al., 2005). All of these factors interact and influence, constrain and limit the production of knowledge (Scheurich, 1997).

As previously stated, the researcher served as the person (a consultant with expert knowledge) appointed by the DoE to be responsible for the implementation of the technology under study. This role involved coordinating activities between principals and the DoE to ensure success with EMIS. This included conducting training activities, communicating with senior management on the progress of the project, providing leadership for the project team and communicating with the vendor. The researcher worked from the project office and strongly supported EMIS for several reasons. Firstly, because there was a strong belief that EMIS would benefit the schools by helping to sort out some of the administrative challenges associated with handling student data. Secondly, because the technology would benefit the DoE by providing readily accessible data without having to constantly contact the schools.

Loxley and Seery (2008) describe a researcher conducting research by members of the same group in which the study takes place as an insider. However, despite working for the DoE, the researcher was still not considered to be an insider in the actual schools. It was through

the many site visits to the schools that school staff began to regard the researcher as a privileged insider. This impression was noted on several site visits when staff members brought issues concerning students into the principals' office but hesitated to speak when they noticed my presence. Only after the principals affirmed my presence as acceptable (e.g. through a simple gesture) did they continue to present their case. At times, principals would make comments about what they felt needed to be done, and then instruct the researcher to share their comments with senior management at the DoE. The feeling experienced during those moments is similar to what Sikes and Potts (2008:14) describe as an 'insider who is an outsider'.

The researcher's prior appointment by the DoE was valuable since it enabled him to have an understanding of the day-to-day issues commonly experienced by the participants, and as reflections were made, the researcher was able to confront assumptions with EMIS (Smyth and Holian, 2008:34). While working as an insider it became apparent that little was known about the leadership of technology as used by principals in The Bahamas context. As an insider, knowledge was gained of each school's leadership, the principals and their situation with EMIS. Also, the researcher was easily accepted by the principals and staff members at the school. As Le Gallais (2008:46) noted, the inside knowledge of the research enabled the researcher to bypass much of the familiarization necessary to find common ground and establish a relationship. This knowledge as an insider provided an advantage since the researcher was able to gain more intimate insights into the principal's leadership.

The researcher's prior position and knowledge of the school and educational context contributed to the design and development of this case study. Such experience enabled this study to be in-depth as focus is sharpened on the complex contextual situations situated in a familiar context (Flyvbjerg, 2006). Given the researcher's prior position and knowledge, the

world is considered to be socially constructed and subjective. Although the subjective research design has been critiqued for privileging the researcher perspective, the researcher argues that all research is subjective, including the selection of samples and the interpretation of findings.

4.5 Data collection

In considering the research strategy, it was clear that the modes of data collection needed to account for the leadership perspective. This would appropriately be achieved through questioning principals' on their views, beliefs, attitudes and awareness with regards to EMIS. This would be backed up by documents and artefacts. The data for the study were collected in three phases. The first phase required contacting the DoE to access the case study field and discussing the research plan with education officials. This process took place during April to May 2011. The second phase required contacting principals to discuss their participation in the study and reviewing documents at the DoE. The final phase involved conducting all formal interviews and collecting documents from the principals and artefacts from the schools.

4.5.1 Data collection through semi-structured interviews

Interviews have been used widely in the study of technology and are noted to be one of the most powerful tools for research (Fontana & Frey, 1998). Interviews are particularly useful when qualitative data is required; through them the participants' full oral response can be encouraged (Walliman, 2005). Engaging with participants through interviews allows flexibility for the conversation to venture into areas that may be relevant to the study but unaware to the researcher (Goulding, 2006). For example, a principal may reveal that his/her

support of EMIS is contingent upon interactions with a specific stakeholder. Cohen et al. (2011) note the value of interviews for gathering non-standardised personalised information about how individuals view the world. Three common types of interview are identified: structured, unstructured and semi-structured. The structured interview closely follows predefined guidelines as each question allows no deviation and overlooks the variation of participants' responses. The unstructured interview allows the researcher the flexibility in how the interview progresses as the participants respond freely to points of interest. The semi-structured interview begins with a list of questions or topics to address but allows the participant to be flexible in responding to questions. Researchers recommend the semi-structured approach for interviews since it enables the researcher to obtain responses to a list of topics and questions (Bassey, 1999; Bryman and Lilley, 2009). The semi-structured interview results in responses that are more in-depth when compared to closed structured or unstructured interviews (Fontana and Frey, 2000).

The semi-structured approach to interviewing was used since the study sought to allow principals to respond openly while providing in-depth comments to questions. In addition to the initial questions, the semi-structured approach allowed the researcher to probe responses to follow interesting points that came up during the interview without degrading the quality of the research (Fontana and Frey, 2000; Crano and Brewer, 2002; Cohen et al., 2011). Appendix-I contains the initial interview questions.

The interview process

The first step in the interview process involved gaining access. This required written permission from the DoE to conduct the research (see Appendix-G), and it also provided affirmation to principals that the study was supported by the DoE. Once permission was

obtained, access to the principals was relatively straightforward. The researcher relied on his prior position since the principals were already familiar with his presence. The principal was invited to participate and once consent was given an interview date was scheduled. The enormous time pressures principals deal with when managing in the school, resulted in the researcher expecting 30 – 40 minutes for each interview. As a crucial point, it was necessary to work within principals' timeframe and at their convenience without being an annoyance. The interview was also designed to be flexible for how, where and when the interviews were conducted.

Therefore, two interviews were conducted with principals. The first interview was conducted face to face at their school in their office and lasted 50 - 80 minutes. It began with the researcher providing a description of the purpose of the interview and having principals sign the consent form. Appendix-H contains a sample of the consent form signed by principals; however the originals are kept in a secure place with the researcher. The interview questions provided a starting point for discussion of EMIS and afforded principals an opportunity to present their account with the technology (Locke et al., 2009) (see Appendix-I). The second interview was an informal follow-up interview that took place after principals had received a transcribed record of the first interview and lasted 20 - 40 minutes. The follow-up interview enabled clarification between the researcher and principals as to the interpretation of the responses.

When conducting interviews the relationship between principals and the researcher varied. The bond that developed enabled a discourse where personal information and feelings were shared (Schwandt, 2000:79). For example, two principals spoke openly about their views of EMIS and that the technology would have been much further along if researcher had still been involved with the project. During such time, sharing and negotiating of understanding

took place. It was important for the researcher to be aware of coded messages that were shared when participants were reticent expressing views that countered the norms (Brenner et al., 1985). The researcher's prior position and experience was helpful when listening for such meanings then interacting unhindered by planning the next question. This enabled a narrative to develop that flowed within the social constructivist framework (Sayer, 2005). This meant that listening for their views and areas of concern were helpful for exploring understandings buried deep within principals' explanations.

Several of the initial interviews had to be rescheduled due to interruptions. In one instance a principal had to address an issue with a few parents due to their child's suspension for being involved in a mud wrestling video that was posted on YouTube. In the video children were dressed in school uniform and there were incidences of nudity. Among the 12 interviews, 8 had to be rescheduled and rescheduling each interview took 2 - 4 weeks.

4.5.2 Document and artefact data collection

In addition to interviews, written communications from principals and those associated with EMIS were collected as sources of data (Cohen et al., 2011). These documents contributed to the leadership, cultural and school contexts revealing information about the local setting and the day-to-day interactions of principals in the education system. The documents were also used as a form of accountability, justification for protocol, to support action taken and to trace how EMIS was used (Prior, 2003:61). Several key features of how documents are used in the education system render them as relevant data sources. The first includes the way in which documents make up administrative records and act as a primary source of communication (Prior, 2003: 87). Represented in them are the official written records for identifying or explaining instances where leadership occurs and for recognizing the preferred

course of action (Sapsford and Jupp, 1996:302). Seeking factual information directly from the content within these documents provides insight into contexts important to this study.

An essential part of principals' work relates to the production of documents, some of which are official and others unofficial (Sapsford and Jupp, 1996:302). Official documents include written communication with legally binding implications such as policy documents, attendance records and report cards; these tend to be signed or stamped and dated. Unofficial documents include written communication without legal implications such as manuals and booklets. Through these documents principals communicate with staff members as well as other stakeholders. Prior (2003:21) notes that documents function as carriers of messages, objects of translation, impediments to understanding and as support for interactions. What is written reflects a series of accounts about the nature of interactions with EMIS.

According to Cohen et al. (2011), document analysis involves systematic examination of the document in order to identify the needs, aims and messages described within the organizational activity. Two types of document are noted, primary and secondary. The primary document includes communications written by the principal (e.g. the end of year school report). The secondary documents include relevant documents written by any individual/s other than the principal (e.g. minutes of meetings, DoE booklets and white papers).

After conducting the interview primary documents associated with EMIS were requested from principals. This process did not yield much result because principals did not make any written communication about EMIS besides their end of year report that was sent to the DoE. Most of their communication was conducted primarily over the phone and with face to face conversations. The researcher did, however, note the artefacts associated with EMIS.

Artefacts included any objects that the researcher perceived as useful for the study. These were noted for making inferences about events, results of interactions, evidence of activity and as a means of data triangulation (Yin, 2013). Since it was not possible to collect the actual artefacts from schools pictures were taken, including:

- Copy of old report card (Appendix-J)
- Master timetable posted on wall (Appendix-E)
- Attendance book stored in cupboard (Appendix-D)
- Server stored in principal office (Appendix-C)
- School network connection (Appendix-C)
- Computers in computer lab (Appendix-D)

In addition documents were collected from the DoE, including:

- Principals' yearly reports (scanned copies held with the researcher)
- Teaching in the Public Education System in The Bahamas (DoE, 2004)
- Monitoring, evaluation and reporting mechanism resource booklet (MoE, 2009)
- Safe School Protocol manual for public schools (DoE, 2009a)
- School and Principals directory (DoE, 2011a)
- School Calendar (DoE, 2011b)

From these documents the researcher gathered information about the contexts where perceptions of EMIS, school leadership and the education system in The Bahamas were

situated (Sapsford and Jupp, 1996:142-4). What is written and how it is written are expressive of specific and distinctive ways of thinking, organizing and acting. Analysing these documents allowed access to culturally significant issues (Prior, 2003:48).

4.6 Study sample

The principals in this study were purposely selected by the researcher from the total population of principals in The Bahamas that had recently implemented the same EMIS. Researchers note the use of purposive sampling to intensively study specific information about a few cases (Cohen et al., 2011). Sampling of this sort often relies on the judgement of the researcher (Bernard, 2000: 176; Cohen et al., 2011). The rationale for purposeful sampling is based on the researcher's years of professional experience working with principals, the school setting and senior management at the DoE in The Bahamas. This experience is useful since it provided guidance as to the DoE's handling of EMIS, the formalities for access into the schools, the principals to be contacted, and principals' interactions with stakeholders involved with EMIS in their schools.

At the time of this study, 15 principals in The Bahamas implemented EMIS; 6 were at high schools, 4 were at junior high schools, and 5 were at primary schools. To identify the principals for this study purposive sampling was used based on the principals' consent, school type and the extent to which EMIS was used in the school (Bernard, 2000; Cohen et al., 2011). Whilst it was intended to include all possible school types (see section 2.3.1), it was evident that the number of principals participating in the study would have to be limited. Considering Yin's (2013) suggestion on the number of cases, 6 principals were selected from the total of 15 principals: these included 1 high school, 3 junior high schools and 2 primary principals. All participants are principals of public schools in The Bahamas and although the

understandings of the six principals selected varies, their roles within the education system are similar. The sampling methods adopted targeted potential principals using the following criteria:

- *Involved in the implementation of EMIS* – the number of years that the principal was involved with EMIS was not considered important, however it was felt that the principal should have some experience working with EMIS (i.e. at least one school year);
- *Representative* – the sample should represent the broad make-up of the education system in terms of school type (see section 2.3.1); and
- *Supported* – the principal should be willing to participate in the study.

Drawing upon this professional experience and the literature that recognizes principals as the pinnacle of school leadership, six principals are selected as participants. The principals were practitioners who, while carrying out their responsibilities, are involved with the same initiative from the DoE in The Bahamas.

4.7 Data analysis

This study explored EMIS through the understandings of six principals. The social constructivist approach enabled focus on the view of each participant and their interactions with stakeholders involved with EMIS. The researchers' prior experience as an insider provided the basis for the research questions (see discussion in section 1.3) and a review of the literature on EMIS in developing countries and the principals as technology leader (see section 3.2) provided the basis for categories used in the semi-structured interview questions. The interview guide can be found in Appendix-I. General questions included: 'what can you

tell me about the technology'; 'who were some of the key persons you work with when using EMIS'; and 'how did you use EMIS'. In addition, probing questions were used for depth of information such as 'what happened next' or 'how did you feel about that', 'what are your views on that' which allowed principals to talk about what was important to them, and as their understandings were privileged new sites of interpretation emerged (Yin, 2013). Their personal memories showed their sense making of their experiences with EMIS as they communicated the activities they perceived (Rogaly and Taylor, 2009:30).

The responses of principals were transcribed immediately after the interview. As a starting point for the data analysis the transcribed data were read several times. Analysis of the data was open-ended and generative, utilizing inductive reasoning (Lincoln and Guba, 1985) to trace relationships among the phenomena (Bryman and Lilley, 2009; Merriam, 2009). The approach to data analysis focused on the development of explanations of principals' understandings with two levels of analysis: individual and cross case.

4.7.1 Individual case analysis

This case study includes embedded case studies of the understandings of six individual principals. Each case analysis process began with a close reading of the transcript and reflecting on the data (Richards, 2005). This process allowed the researcher to become familiar with the complexity and contexts of each principal. Next, the researcher relied on his understanding of the theoretical concepts (see sections 3.2, 3.3 and 3.4) to assign codes to relevant segments of texts in the transcripts (Miles and Huberman, 1994; Yin, 2009). These codes were assigned to principals' accounts of their understandings of EMIS. This process facilitated the identification of subthemes and themes where specific incidences with EMIS were involved (Bryman, 2009; Merriam, 2009). Miles and Huberman (1994) describe this

process as sequential since the data are reduced and displayed in order that conclusions can be drawn from the material. Reducing the interview data involved selecting and coding important concepts from transcripts so they could be retrieved later for more thorough analysis. Displaying data involved retrieving codes to search for themes and subthemes. The researcher analysed the presence and meaning of words and concepts in the transcripts, making inferences about the principals' understandings of EMIS, leadership in the school, the education system in The Bahamas, and the Bahamian culture (Radnor, 2001). Some codes did not fit well into themes and were dropped or recoded. The original research questions and interview schedule provided the initial sorting of categories. However, the themes and subthemes emerged from the discussion of the transcripts. This approach allowed concepts to emerge from the data as the researcher became more familiar with the content.

The individual case reports presented explanations with regard to EMIS. The arguments described in the literature review of EMIS (see section 3.2) and principals as technology leaders (see section 3.3.3) were examined in light of the data. The analysis was approached from a social constructivist perspective to produce explanations of the dynamics of EMIS, the school processes, educational practices and leadership roles in the school. Thus focus was placed on interactions in the school where EMIS were involved (Bhatti and Adnan, 2010; Bisaso et al., 2008; Wicander, 2011; Chitolie-Joseph, 2011); stakeholders involved with the principal during the implementation (Fairhurst, 2007; Currie et al., 2009); and principals' understanding of EMIS contributions. In addition, attempts were made to understand the leadership environment where principals' professional practices were conducted, i.e. the school processes (Gooden and Preziosi, 2011); school infrastructure (Powell, 2006; Bisaso et al., 2008); leadership type (Fry, 2005; Spillane and Healey, 2010; Northouse, 2014; Hallinger and Heck, 2010; Hallinger and Lee, 2014).

In addition to interview transcripts, documents were analysed. School documents are a part of the everyday world and using documents as a source of data was useful for the phenomena under study (Prior, 2003: 87). However, the specificity of the audience and purpose of the documents did pose some degree of difficulty. For example, some letters produced by the DoE are addressed to superintendents and principals; however, only select district superintendents and principals received copies of the letter. In order to address this difficulty, the researcher's prior knowledge and understanding of the education system was useful in analysing and interpreting the documents collected. This included careful consideration of the manner in which the relationship between principals, the stakeholders and EMIS were modulated through text. Prior (2003:10) suggested following the document through its social trajectory to understand how it is used, and then analysing how it is constructed and how it functions for content. For this purpose the researcher's prior involvement as an insider provided the basis to produce messages about principals' understandings (Prior, 2003:149).

Within this study, documentary analysis involved the systematic examination of the content of documents as a strategy to provide insight into the organizational and cultural context within which principals' are situated. Thus, documents were collected from the principals and from the DoE (see section 4.5.2). Among the documents collected the principal's report provided valuable information about the school, leadership and cultural contexts within which principals' understandings evolved. This document was produced by principals themselves for the DoE and represented the formal communication between senior management and principals about their school's activities. This document was interrogated with regards to references to EMIS, interactions with stakeholders and implications for leadership.

The overall aim of the documentary and artefact data was to construct an understanding of the organizational and cultural context, and to support the findings obtained from the interviews. Yin (2013) argued that for case studies, the most important use of documents is to support and reinforce evidence from other sources. In addition, documents and artefacts contributed to triangulation and this in turn contributes to the validity of the data. The findings from the embedded cases data analysis are presented in chapter 5.

4.7.2 Cross case analysis

This case study, in essence, explores issues associated with technological change and how the leadership perspective in context has not been taken into account. A cross case analysis was carried out to enhance understanding of the relations that existed among individual cases. The cross case design enabled the collection and analysis of the data for possible similarities and differences in the categories, subthemes and themes of the embedded cases (Eisenhardt, 1989). These similarities and differences were sought to ensure that the explanations for the phenomena under study develop from verifiable data (Creswell, 2007; Lincoln and Guba, 1985).

Once the analysis of each individual case was completed, the researcher went back to the coded segments of each case transcript to compare and contrast between different principal's responses. New themes and subthemes were assigned from analysis of the individual case subthemes and themes. The new themes were placed into Microsoft Excel and examined for similarities and differences within and between each other, and generalizations were made (Yin, 2013). The iterative examination yielded a set of broad categories that described a number of key perspectives with EMIS. Using Microsoft Excel enabled various quotations

related to the same category to be grouped together and easily accessed. The process resulted in the identification of the following themes:

- Conflicts
- Generating report cards
- Facilitating school management
- Monitoring mechanisms
- Foreign impact
- Impacting relationship with stakeholders

The reporting style follows the findings that emerged from the data as principals' responses to the questions were explored. This allowed the researcher to examine principals' responses to the same question to make cross case comparisons (Yin, 2013). The findings for the cross case analysis are presented in Chapter 6.

4.8 Pilot study

Having considered the nature of what is to be researched, a pilot study was conducted prior to the actual data collection. The pilot study was conducted in The Bahamas by purposively selecting a principal from one of the schools who had recently implemented EMIS. This principal was interviewed according to the discussions and questions presented in section 4.5. The interview technique is arguably the most significant means of gathering qualitative data, thus it was used in a semi-structured format (Cohen et al., 2011; Stake, 1995). No documents were collected during the pilot study but considerations were made of potential artefacts

around the school that could be collected, some of which included: posters on the walls, computer lab set up, networking infrastructure and server location.

In the pilot study, the researcher noted that the principal became nervous when discussing financial issues and negative leadership activities (e.g. coercion). This is consistent with Bryman (2012) who argued that in interviews it may be possible to identify questions that make respondents feel uncomfortable. The results of the pilot study were useful in allowing the researcher to focus on areas that may have been unclear previously (Cohen et al., 2011; Yin, 2013). For example, it was assumed that principals' level of use with EMIS was associated with leadership and training issues, but the DoE's expectations for EMIS were also factors. In addition, the pilot study informed the researcher of the adjustments needed to improve the methodology. Such adjustments involved reorganizing the order of the questions, changing the wording of several questions, and affirming anonymity of responses. The pilot study was also useful in timing discussions for the main case study because it helped the researcher to estimate how long the interview is likely to take and how the participants would react (Bryman, 2004). In addition, the study supervisor assessed the relevance of the content in the instruments and this advice was incorporated in the revised data collection instruments.

4.9 Trustworthiness of research findings

The design and approach of this study are laden with the researcher's subjective interpretations of data as well as ingrained values and preconceptions. Understandably, research involves assumptions about the research process which makes unforeseen problems inevitable (Wellington, 2000). Two common issues that challenge the quality of case study research include validity and reliability. Validity measures are intended to ensure that the researcher measures what the study is supposed to measure and address issues relating to the

objectivity/subjectivity of the researcher, appropriate methodology, instrument representation and the approach to data collection (Winter, 2000). Construct validity represents a more operationally methodological error where the questions pursued in the field match with the overall research question (Yin, 2013). Reliability addresses the issue of whether a researcher would be able to arrive at the same insights if the study was conducted along the same steps again (Denzin et al., 1994).

Although credibility is a major concern for quantitative research, qualitative researchers criticize the terms validity and reliability as they are based on assumptions of quantitative research methodology (Creswell, 2003; Janesick, 2000). Consequently, terms that are more consistent with the qualitative methodology are adopted. These include: trustworthiness which is used by qualitative researchers to determine the transferability, credibility and verification of the investigation (Creswell, 2003; 2007).

Transferability challenges the extent to which findings can be applied to a similar context. Researchers argue that although cases are different, transferability can enable comparison of concepts in similar or different contexts (Stake, 2003; Flyvbjerg, 2006). As the researcher provides rich descriptions of the case context, readers are able to relate to the study (Lincoln and Guba, 1985). Credibility is associated with the researcher's familiarity with the context, sufficiency in the range of data with claims made, comparisons between datasets, and with the fact that there are strong links between the researcher's arguments and analysis (Charmaz, 2008). Addressing credibility required the researcher to be reflexive by questioning whether the findings in this study actually happened. This process can be regarded as a form of internal auditing since the arguments are cross checked, feedback from participants is gained, and colleagues provide comments throughout the research process. In addition, the research underwent scrutiny by the researcher's supervisors, who not only suggested strategies to use,

but also raised questions regarding the theoretical approach, methodological design and interview data.

Verification relates to whether the information collected can be confirmed (Creswell, 2007). The idea is to ensure that the findings are the actual experiences of participants rather than poor research technique (Lincoln and Guba, 1985). Verification is addressed by the use of triangulation (Cohen et al., 2011; Denzin, 1989; Miles and Huberman, 1994); more specifically, data triangulation since it involves the interviews, documents and artefacts collected (Denzin, 1989). As a tool for analysis, triangulation enhances the researcher's ability to understand the same phenomenon from different datasets.

By adopting the guidelines suggested by Stake (1995:87), trustworthiness is addressed throughout different stages of this research study to ensure validity and rigour. One strategy involves the provision of the raw data prior to the discussion. This enables the readers to judge the quality and accuracy of the researcher's interpretations (Stake, 1995). Another strategy was the use of multiple sources of evidence to reinforce/support the findings and the interpretations (Robson, 1993). This strategy involved refining interpretations or findings from the case in the light of evidence that refutes a previous interpretation (Robson, 1993). This strategy helped improve the truthfulness since interview data were matched with documentary data and artefact data. Another strategy included the prolonged engagement and close subjective, and yet professional, relationship with participants in the field (Fetterman, 1989). Principals were given a copy of the transcribed interview and asked to provide feedback, which was taken into consideration. The final strategy involved the use of a pilot study. A pilot study was conducted with a principal, which allowed the researcher to check the clarity of the interview questions and modify the research process as needed. Conducting the pilot study permitted preliminary testing of the methods and procedures so

that the usefulness was evaluated toward a more precise design (Yin, 2009). It informed the research process and reduced the number of unanticipated problems.

4.10 Ethical considerations

Several steps were conducted to ensure this research project was ethically sound. The first step involved following the internal ethical review procedures at the University of Sussex. This involved a formal process where the purpose of the study and the participants involved with the study were subjected to review. A copy of the certificate of approval can be found in Appendix-F.

The second step involved obtaining clearance from the DoE to conduct the research in the schools in The Bahamas. This required writing to the Director of Education in The Bahamas for permission to enter the school and for principals to be a part of the research study. A copy of the approval letter obtained from the Director of Education can be found in Appendix-G.

In addition, it was necessary to obtain consent from all principals. This involved informing principals of the purpose of the study and how they were expected to participate. In addition, a signed form indicating the purpose of the study, their expected level of participation, and intended use of data collected was obtained. A copy of this form can be found in Appendix-H. When the research participants were informed about the research project and understood what their participation in the research involved, Howe and Moses (1999) suggest that it is up to the participants to decide whether to take part.

Another step involved confidentiality. This was recognised not only in the relationship between the participants and the researcher, but also in the handling of records. School leadership often involves handling confidential information on the students and staff that, in

most cases, is stored in EMIS. Misuse of this information wrongs others within the school and research community and damages the overall project. The researcher upheld confidentiality by not gathering or revealing identity data to the general public. This was extended to protecting the privacy of school artefacts, documents and government documents reviewed. In addition, the sample size of this study is small; the opinions of the participants are sensitive and carry weight that impacts on their existing role. Therefore caution was taken to conceal their identity as much as possible by not linking them with the interview responses in order to reduce the opportunity for their opinions being used against them (Thompson, 2010). In addition, caution was used during the interview not to force participants to elaborate on issues that threatened their position. Attention was noted to what participants were saying without interfering and ensuring that information provided was used only for the purpose of this study.

The final step involved reporting the results. This involved the recommendations put forward as a result of the study and the possible misrepresentation of data. Consideration was given to how the knowledge arising from the research could be used or misused.

Research ethics are not only a matter of internalizing professional codes of conduct, they are also a matter embedded in the totality of scholarly practice from the initial process of framing the question, to the publishing of scholarly text (Ham, 1999; Baarts, 2009). This ensures high ethical standards are necessary throughout the entire research process.

4.11 Limitations

This case study is exploratory with several limitations. The first limitation comes from a methodological point of view and involves the use of a case study approach which has been criticized for lacking objectivity and ability to make generalizations. However Flyvbjerg

(2006) argued that individual cases can form a component of a wider case that readers can relate to relevant aspects. The discussions of this limitation have been mentioned in section 4.3.

Perhaps one of the more noticeable limitations exists in the proposed research topic; that is, the leadership perspective. Understandably, the dominance of a single view of an issue is a built in limitation but is necessary to bring focus to EMIS in local context and to speak to the gap in literature with regards to the implementation of EMIS. There is a relationship between the researcher's position as an insider and that of a researcher, the principals and the context that can help to improve our exploration of leaders' understandings in a given context.

Purposefully selecting the participants introduces limitations. By including voluntary participants the researcher was able to access each principal's understandings of EMIS in depth: these participants were able to provide an open and genuine account of their experiences (Bernard, 2000). In addition, the timing of the study introduced further limitations. Conducting this study within public schools in The Bahamas that introduced EMIS five years prior to the proposed research start date posed limitations. Participants may not be able to recall events as they occurred. Thus the responses were subject to the memory of the interviewees. This study addressed this limitation by linking the social constructivist approach to detailed analysis of principals' understandings of EMIS.

Another limitation of this study is the researcher's position as an insider. Researchers regard an insider as a member of a group who share characteristics of the group that is under study (Loxley and Seery, 2008:16). On the contrary, the position as an insider afforded several advantages to this study including focusing on everyday issues as those involved experience them; confronting oneself and others with personal assumptions, perceptions and their

consequences; enabling the researcher to learn, reflect and act based on an insider experience; and engaging with what and who the researcher is curious about (Smyth and Holian, 2008:34). This inside knowledge enabled the researcher to short-cut the familiarization phase usually necessary to seek out common ground and establish a research relationship (Le Gallais, 2008:146).

As an insider the researcher gained knowledge of the school, the principals, the school leadership processes and the situation with EMIS. Being an insider also enabled the researcher to be easily accepted by senior management, the schools leaders and school stakeholders. All of the principals are known to the researcher and may have responded differently if a stranger conducted the same study.

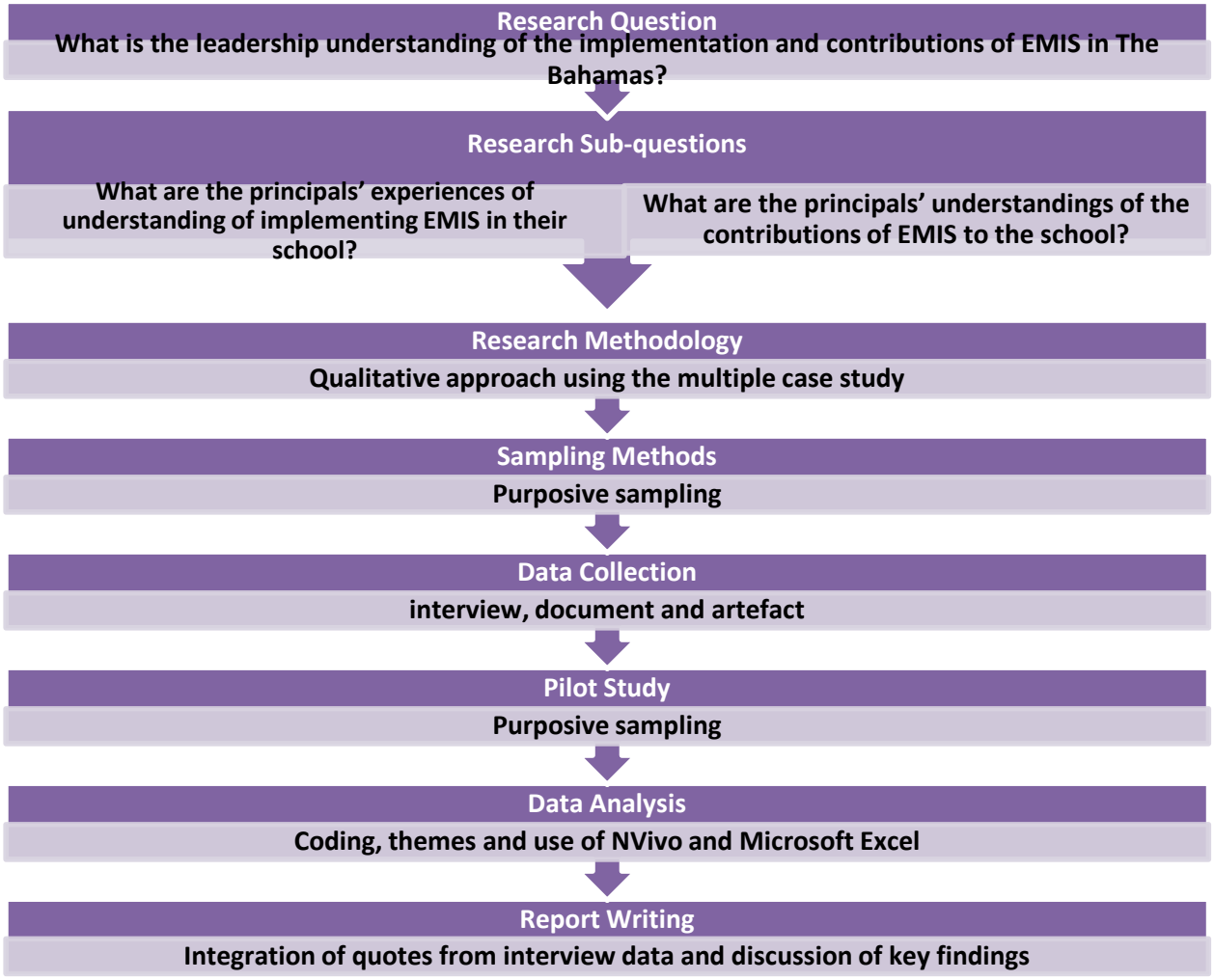
Finally, reliance on interviews, documents and artefacts as the only data sources pose limitations. Some may argue that observation is the ideal method when studying human behaviour. This argument suggests that to understand what leaders are doing the researcher would have to observe them in the act of doing. As the researcher, two issues of concern are raised with regards to observation, the first of which relates to positionality. The researcher's prior level of involvement with EMIS would not allow for participant observation without interrupting the research environment. For example, if the researcher attempted to conduct an observation, participants would direct questions to the researcher about the process or procedure of EMIS or participants would seek the researcher's approval or commendation. The second issue of concern involves privacy. Observation in this study would involve listening in on conversations and being involved with activities that are confidential to other persons not directly involved with this study. For example, principals frequently have discussions with parents or law enforcement officers. Further, the nature of the work of principals involves high demands on their time and attention. Using observation would place

further demands on them, thus limiting their participation in the study. The fact that the present study is exploratory and open to emergent issues makes it inevitably vulnerable to limitations.

4.12 Summary

This chapter has discussed the research methodology used in this study. This study adopted the case study approach to understand the leadership perspective of EMIS, more specifically, 'what is the leadership understanding of the implementation and contributions of EMIS in The Bahamas?' A pilot test was used to establish the reliability of the research design and data collection instruments. In the main study, the qualitative phase of the study adopted a case study method to collect data from interviews with principals selected through purposeful sampling. The data were analysed using iterative thematic analysis to identify themes and patterns in the data that answer each sub-question. Table - 4.1 below presents a summary of the research process.

TABLE-4.1 SUMMARY OF RESEARCH DESIGN AND METHODOLOGY



Adopting the social constructivist paradigm allowed the use of a variety of research tools i.e. interviewing and document analysis. It also allowed focus to be placed on people, in addition to the research being located within multiple contexts. The integrity of the research was established through the discussion on positionality, ethical considerations and by highlighting the limitations of this research.

CHAPTER 5: THE PRINCIPAL'S UNDERSTANDINGS OF IMPLEMENTING EMIS

This chapter analyses individual principal's understandings of implementing EMIS. In doing so, it provides an overview of each principal's leadership, each principal's instance of leadership with EMIS, and each principal's understandings of EMIS contribution. Finally, it summarizes the analysis.

5.1 Overview of P1's leadership

P1 is a principal of a junior high school with 65 teachers and 6 administrators. The student enrolment for 2010 was 437 boys and 392 girls (total 829 students), organized into 69 classrooms. The instructional programme of the school covers nine core subjects taught to all students and eight elective subjects for students to choose from (P1, 2 R9; 5R9)[22]. P1 has been employed with the DoE for over 30 years, of which 20 years has been as a principal. Although an experienced leader, he had only been a principal at his current school for two years (P1, 1:1).

P1 is an active member of the clergy serving as pastor for the Revival Faith Mission Church. Thus, he has a strong value driven sense of education rooted in Christian beliefs. It is not surprising that his philosophy of schooling is associated with a sense of duty where the school staff does all it can to '*promote spiritual, creative, technical and academic growth while instilling values, morals and offering guidance to every child entrusted to his care*' (P1, 3R). His vision for schooling is to develop a culture '*that promotes excellence through*

[22] The names of principals are replaced with the letter P and a number. In the reference, the letter P and a number are used to indicate the interview transcript where the principal comment is located, i.e. 'P1, 1:1' indicates Principal 1 on page 1 line 1 of the transcript. Also, the letter R refers to the principal report. Thus, 'P1, 2 R9' refers to Principal1's principal report on page 2 line 9.

participation in global, technological experiences that are required for work and life in the new millennium' (P1, 4R9). For P1, education is a trusting partnership between students, teachers, parents and the community. He believes that *every child is entitled to an education through quality instruction in a safe, disciplined environment*. He occasionally uploads special events held at the school on his YouTube page[23]. Reflecting over his years as principal, he recognizes his greatest accomplishment as,

> *. . . seeing several groups of students go through and complete the full phase of their three years of schooling. Also, seeing some at risk students and behaviourally challenged students come to an understanding of what schooling is all about and changing their attitudes and their behaviour to become a success. I have seen in my thirty years a number of students that have come through my teaching and who now hold respectable positions in society, and they all credit their turn around to my mentoring, my coaching, my assistance with their education (P1, 1:23).*

P1 outlined several goals for the school that focus on the physical plant, student management and staff professional development. Among his eleven school goals, five were associated with student management relating to skills development, punctuality and examination improvement (P1, 9R9). These goals are in line with the DoE sub-goals for education in The Bahamas (DoE, 2004), particularly with regards to providing high quality learning experiences for students.

When reflecting on school improvement, P1 expresses interest in improving several areas of the school, most of which are associated with his students' performance (e.g. academic, social and attendance). An underlying concern for improving students examination scores seem to be common to all his goals for the school. The focus on examination results is noted

[23] See http://www.youtube.com/user/turnipwindow185. Accessed January 2014.

by Bahamian researchers as a major concern for school leaders (Collie-Patterson, 1999; Cleare, 2011) and highlights a core motivation for most school activities. Although P1 expressed interest in improving students' examination performance and had made explicit the school's plan for achieving such improvement (P1, 6R), an actual improvement in students' examination results was not realized. The national examination report for 2012 did not indicate any improvement in students' BJC examination performance (DoE, 2012). This finding points to the complexity principals face in improving students' academic performance. Such complexity is noted through a correspondingly complex goal oriented design to improve students' examination scores.

5.1.1 P1 and the implementation of EMIS

A leaders with high expectations for EMIS

P1 indicated a positive view of technology and held high expectations for its use in the leadership and management of his school.

> *In my work as a principal technology is very, very important. In fact, it is almost a permanent fixture in management and supervision of the instructional programme. If I did not have the technology and if I could not rely on the technology I perhaps could not complete all the assignment in the areas of personnel, instruction, and discipline. Even in the socialization of students and the social aspects of students we have to utilize technology (P1, 1:29).*

P1 was the only principal among the participants in this study attending EMIS training sessions held at the project office. Although he did not perform many operations within EMIS, i.e. assigning students to classrooms, searching for student data or printing a report, he

believed that having an understanding of EMIS facilitates his capacity to manage staff and provide leadership decisions on how the technology should be used (P1, 2:38).

> *When the new EMIS programme came out and your department asked us to come to the Learning Resources Section into the computer lab so that you can assist us working with EMIS.. . I went along even though that I knew that I was not going to be directly dealing with it (P1, 2:27).*

Researchers have associated the lack of training among the reasons for the lack of success with EMIS (Visscher et al., 1999; Wako, 2003). One argument suggests that the lack of training results in 'ad hoc use' of the technology (Bisaso et al., 2008). Training has also been associated with more knowledgeable use of EMIS with regards to retrieving information and skilfulness with decision making (Visscher et al., 2008). P1's high expectations for EMIS facilitate his interest in training. However, P1 indicates a personal preference with regards to the purpose of training and how the knowledge gained during training is used.

> *I wanted to be abreast because if a teacher messes up in the inputting of grades the administrator who is a senior person, a senior master/senior mistress, still has to come to us who is the principal, to the head of admin to say this is the situation. And if I don't know what the person is talking about! If I don't have no idea! If I had not gone into the program, seen how it works! So that is why I went to the programme to get involved with the training (P1, 2:33).*

This implies that although principals participate in training exercises, the information gathered and the use of training knowledge becomes subject to personal values. For P1, training seems to be a form of accountability for being able to provide informed direction to staff members when a conflict arises with EMIS. His view of training also seems to be associated with the bureaucratic organizational culture of the education system in The Bahamas where major decisions are made through the formal organizational structure (see

section 2.4.2). Despite having high expectations for EMIS, P1 seems to indicate that the use of knowledge gained through training flows within his accountability as principal.

Distributed leadership with EMIS

P1 had been involved with EMIS at another school, and when he came to the current school some practices associated with the technology were already in place. Instead of developing new practices he worked with the existing leadership to support EMIS. For example, he noted that the school's guidance department had the primary leadership responsibility with EMIS.

> *At this school it was the guidance counsellors. I have found that the guidance counsellors run the program. At this school there was also a senior master who is now moved on to another school. But the senior master along with the guidance counsellors and several key teachers organized a plan and get it [EMIS] operational and running (P1, 2:48).*

P1 noted how leadership with EMIS had been distributed to the guidance counsellors. This distributed leadership occurred as the senior master, who originally had responsibility for the system, had left the school. Through a working relationship with the senior master, the guidance counsellor gained technical expertise and knowledge of EMIS operating procedures. This technical knowledge provided the guidance staff member with leadership opportunities not normally available and in doing so altered the traditional work arrangements and responsibilities. This finding differs from the traditional organizational working structure and is found to be similar to technology leadership noted by Chitolie-Joseph (2011) where the successful operation of the technology often resides in individuals rather than in the organizational processes. This means that when key individuals are removed from leadership challenges occur threatening the continued implementation of the technology. As P1

supported the leadership distributed with EMIS, he noted the impact on the school's administrative decision making process:

> *Every directive that we give to the teachers with regard to compiling the data into EMIS we have to communicate that with Miss [NAME] and the computer teacher. We would ask them, how much time do you need to generate the reports (P1, 3:13)?*

EMIS enabled some teachers to have leadership responsibility in the administrative process of the school, particularly with regards to the school's reports. Although leadership with EMIS was distributed, the decision making associated with the timely production of school reports was not distributed. This meant that the decision for the timely use of EMIS was constructed by the organizational guidelines outlined in DoE policy. This finding supports the arguments of Hatcher (2004) with regards to the existence of centralized control on distributed leadership. With the leadership responsibilities of EMIS distributed, P1's leadership with EMIS was noted as he monitored teachers' activity with the technology.

When reflecting on the DoE's involvement with EMIS, P1 noted the need for additional infrastructure (P1, 5:22). Although at P1's school teachers have access to several computer labs where one computer exists for every two teachers, few computers are found in teachers' classrooms. This means that a teacher who desires to use EMIS would have to find a lab from which to work (see section 2.3.2). P1 associated the additional infrastructure with improving the efficiency of EMIS (P1, 5:39). His view of improvement seems to be associated with access where each teacher would be able to access EMIS at the same time (P4, 5:31).

Improving the data

Researchers have suggested arguments for using EMIS as a way to improve the quality of data; some argue for printing and ease of access (Visscher et al., 1999) and some for organizing data (Wicander, 2011). The findings reveal that P1 regarded improvements to the quality of student data to EMIS. He noted that inserting students' demographic data into EMIS during the registration process (see section 2.4.2) helps to ensure correct student demographic information on reports.

> *Students come from the primary school with the name [Alex] in September and by December that same child wants to get a report card with the name [Alexander]. The name spelling have been changed, the age sometimes has been changed. . . So when they come in September we put them on EMIS (P1, 4:15).*

Improvement to student data was also noted in the accurate recording of students' grades. Thus, as the calculations of student grades shifted from teachers' manual calculation to EMIS, P1 attributed the improvement in the accuracy of school data to EMIS (see section 2.4.2).

> *Yes and the data would have had a more objective characterization. We did not have to rely on the teachers calculating the scores. There was more accuracy. Human error was lessened because once we put the grades in EMIS programme would generate the report card, calculate the grades and come up with the final results that would be put on the report card (P1, 1:49).*

As P1 links accuracy with student data to EMIS he undermines practices associated with compiling school data (see section 2.4.2). He seems to perceive a direct link between improvement in data quality and the features of EMIS rather than managing the processes associated with recording data. In this sense, the information handling procedures of the school are overlooked, particularly with regard to accuracy in recording. This finding echoes

Powell's (2006) call for more attention to be given to improving the information processes. Such attention would involve reliance upon existing leadership practices to make explicit the processes for handling school data.

By implementing EMIS a deficiency in leadership practices are noted where P1 seems unaware of the need to manage the process associated with accuracy and completeness of school data. For example, he comments on teachers' recording of students' grades:

> *So some of the teachers realised that their personal calculation they could not be as subjective as they wanted. The calculation has to be objective. The data must speak to objectivity not to the subjectivity of the whim of the teacher . . . EMIS is only going to do the mechanical calculation (P1, 4:41).*

P1's comments indicate a need for more attention to be given to managing the school's data entry processes, particularly with student grades. For P1 the inaccurate information on student reports gives the impression that students are performing at a certain level. Such false information, he believes, has implications for the learning and management practices because when students are perceived to perform less/more than they actually do at a particular level, a negative or false reflection is associated with the learning practices and the management of schools. As P1 speaks of the *whim of the teacher*, he seems to indicate a need to address the ethics of professional practice with regards to honesty in reporting (Doe, 1983, 2004). This seems to be associated with the leadership and management responsibilities of the principal (see section 2.4.2).

Monitoring the teacher

P1 noted that EMIS was used to monitor teachers in their work.

> *They can tell us how many teachers have put in information in their mark book, because they watch every day. They come to the program, they can know whether a teacher put in their information yesterday, they can know whether a teacher put in their information wrongly, they can know whether the scores we have in the mark book are different from what is on EMIS. They are monitoring the work that is being put inside (P1, 3:16).*

P1's experience supports the findings of researchers with regards to EMIS being used as a monitoring mechanism (Sarwani, 2003; Cassidy, 2005; Shah, 2009). Whilst Shah (2009) noted that EMIS monitoring capacity exists at district levels, P1's understanding indicates that monitoring exists at school level. Monitoring at the school level affords administrators more agency over teachers in their work processes. Although monitoring is intended to improve school performance and promote greater transparency and accountability in education (MoE, 2009), this seems to be achieved through administrators' convenience and more adherence to teachers' work.

5.1.2 P1's understandings of EMIS contributions

P1's electronic management system

P1 recognised one of the contributions of EMIS was to his leadership of the school. He regarded the technology as an electronic system of management.

> *I would say EMIS has been the electronic management system. We have a management system but because we now live in the age of information, our writing the written data can now be translated into electronic data and we can store more information because of EMIS (P1, 4:11).*

P1's response seems to indicate and support the arguments of international funding bodies with regards to preference for management approaches that rely on electronic data

management to support decision making (USAID, 2011; World Bank, 2011). Whilst funding bodies tend to associate EMIS as a tool for decision makers to efficiently and effectively administer and manage national education systems, P1's association of EMIS seems more in line with local school attempts to keep up-to-date with current practices. Thus, he seems to think that, with EMIS, he is further equipped to handle and store more information that could later be used to support his leadership and management of the school.

P1's understandings of EMIS contribution supports arguments of researchers with regards to EMIS being viewed for its contribution to school management (Sarwani, 2003; Bhatti and Adnan, 2010). As P1 spoke of the contributions of EMIS to his leadership of the school, the researcher sought specific examples of how or where the technology was used to facilitate his management practice. Upon further probing, P1 gave an example of how data from EMIS was used to facilitate the planning of the instructional programme.

> *We use EMIS to project what we are going to do for the next term. For most of our projections for the new term we look into EMIS at last term to comprise timetables and schedules; to see which areas of the instructional programme need a greater weighting; to see which subjects we need to put emphasis on; to see where we can cut out, where we have to improve, what we may need to concentrate more on; and what areas we need to have enrichment. For example . . . last year when we were building our timetable, having looked at the year before we realised that all the students in grades 7, 8 and 9 needed more computer education. We realised that with computer education being offered only as an option, students would select computer education from one of five options. We realised only one fifth of the students were taking computer education classes. So we decided instead of having it only as an option we pulled it out of the option and gave it to all seventh graders. Now all seventh graders have one period of computer education once per week. We are going to look at our data to see what results came out of that (P1, 2:5).*

P1's practical example outlines how he used EMIS to facilitate his decision making process with regards to improving the school's instructional programme. By using the features of EMIS he was able to quickly access the previous year's data and the current year data, compare results and construct tables. This data provided relevant student data from which he and the administrative staff was able to make adjustments to the number of computer classes offered to students. Upon further analysis it is noted that, rather than provide new data, through its report generating feature EMIS allowed school data to be prepared in a way that improved on how P1 viewed and analysed school data. This means that as he selected specific pieces of information, a report could be generated to compare and analyse areas of concern.

P1 also noted the impact of EMIS on the report card process (see section 2.4.2).

> *When EMIS came along, EMIS was able to produce these reports in half the time because we only needed to give the teachers one or two working days to prepare their mark books electronically. Once they would have prepared the mark book, with the touch of a button we able to generate the report card from the information that was input into the database of EMIS (P1, 1:43).*

P1 perceives that EMIS improved the school's end of term report card process by reducing the time required to produce the reports. His perspective on the report card process seems to reflect an administrative view that overlooks the time taken by teachers in the process. Since EMIS was implemented and teachers were required to prepare both manual and electronic mark books, the time needed to prepare the report cards seems to be an addition to the process rather than a reduction. Perhaps the time he perceives EMIS saves is associated with the administrative level and not across the school. Even though he perceives time being saved, no adjustments in work practices, policies or responsibilities are noted.

5.2 Overview of P2's leadership

P2 is a principal of a senior high school with 68 teachers and 8 administrators. The student enrolment at his school for 2010 was 682 boys and 668 girls (total 1350 students) organized into 69 classrooms. P2 has been in the education system for over 15 years and, although he is an experienced leader, he had only been a principal at his current school for 1 year (P2, 1:4). P2 believes public schooling exists to adequately prepare students to actively participate in the work force. He sees his role as principal as ensuring that students are provided with adequate training that would enable them to become knowledgeable workers. This, he believes, is accomplished through discipline.

> *In order for anyone to be successful, there has to be discipline. I consider myself a strict disciplinarian (P2, 1:7).*

Considering the size of P2's school, his emphasis on discipline is partly associated with overcrowding and the level of student violence in The Bahamas education system (see section 2.4.2). When reflecting on his short time as principal, he considered his greatest accomplishment as instilling discipline.

> *Coming to this institution, [Name of school], after hearing all the negative reports about this institution and what I had to do upon my arrival was a challenge. It was one that I was looking forward to and willing to face. I think we would have done a pretty good job, even though at the beginning we would have faced some negative criticism but we did not let that to hold us back. We continued with what we had to do and now where we are people appreciate what we have done. We believe our children will be successful because of the discipline that has been instilled in this institution (P2, 1:8).*

P2's response demonstrates the strong sense of determination and perseverance in his leadership. It also supports the arguments of Massey (2009) with regards the focus of school leaders on student discipline as a way of improving schools.

5.2.1 P2 and the implementation of EMIS

P2's understandings of EMIS were rather complicated. His case certainly provided one of the most challenging areas of the data analysis. The researcher struggled when trying to make sense of P2's experiences with EMIS. When asked about EMIS, P2 only responded in terms of what was wrong with the technology and rarely reflected on anything specific to his current school. Although his experiences at his former school were certainly relevant to his role as leader, his responses focused on the activity of another leader. Whilst P2 did not focus on specific experiences with EMIS at his current school, his responses are relevant for the values and practices he developed with EMIS. Thus, P2's understandings of EMIS are constructed in accordance with his beliefs on how the technology should be used. As he made reference to his experience with EMIS at another school, a strong sense of expectation was noted for the technology. This expectation set the tone during the interview and for the data analysis.

EMIS as a foreign technology which undermines local expertise

P2 believed that EMIS was beneficial to the school. However, his view of the technology was impacted negatively by the foreign origin of the technology.

> *Yea, let me elaborate on EMIS.I was never a fan of EMIS program[24]. I believe that right here in The Bahamas we have persons who can create a programme that can be used in the schools here (P2, 1:34).*

P2's view of EMIS seems to indicate a cultural sensitivity for Bahamian rather than foreign products. For P2, the value associated with the technical expertise in The Bahamas that is able to design a local EMIS seems at odds with the foreign EMIS initiated by the government. P2 seems to regard the government initiated EMIS as an intrusion that overlooks the expertise of local Bahamians. Motivated by the belief '*foreign is not better*', P2 spoke out against the use of EMIS in the school, and at the same time he spoke in support of local expertise. This finding supports the arguments of Bahamian scholars that emphasize the preference Bahamian educators have for the Bahamianization of education system (Urwick, 2002; Massey, 2008; Demissie, 2009; Walkine, 2009; Dames, 2010; Hall-Campbell, 2011). Whilst these researchers consider the teaching and learning environment, this study recognizes the leadership environment associated with the management and administration of schools. P2 preference for a local EMIS could have stemmed from experiences at his previous school where a local vendor designed software similar to that of the current EMIS.

Hiring a local EMIS provider

Reflecting on a past experience at his former school where a stakeholder was contracted to design an EMIS, P2 expressed concerns for how public funds were being used.

> *I feel as though money is being wasted. Last year when I was at [SCHOOL[25]] the programme went down and we had*

[24] P2 reference to EMIS refers to software made up of computer programming codes that calculates data based on user input. This differs from the planning and practices associated with EMIS that aims to improve the efficiency of the education system.

[25] The name of the school is removed to prevent disclosure of the participant.

> *to call a gentleman in who created a programme for us. We paid some [X dollars] and to me that programme worked well. It worked well within the school and that was only some [X dollars] . . . and here [with EMIS] I see millions of dollars (P2, 2:38).*

Hiring another vendor to provide EMIS undermined the DoE initiative and the traditional organizational authority of the education system. This act seemed to be an attempt to destabilize the authority of the DoE in deciding what was best for the school and allow more autonomy for local leaders. In this sense, P2 seemed to indicate that local decision makers would do better with EMIS than national decision makers. Overlooking the views of leaders in the local environment has been an ongoing area of concern for researchers in educational leadership (Hatcher, 2005; Luckcock, 2010; Myles, 2012). These researchers recognise the importance of local leaders' contributions to the decision-making process.

The difference in funding perceived by P2 between the higher priced foreign technology and the local designed technology was captured in several articles in the local newspaper. One of which reported that US$6 million was spent by the government over the past five years on student information software licenses (Nicolls, 2011). The $6 million could be a portion of the US$60 million loan the government received from IDB, of which, US$18 million has been approved[26]. Whilst researchers recognise funding as a major aspect of EMIS (Sarwani, 2003; Powell, 2006; Chitolie-Joseph, 2011), the concerns of P2 seems more in line with the findings noted by Chitolie-Joseph (2011) with regards to ensuring the government receives adequate service since it was spending so much money on the technology.

[26] IDB website http://www.iadb.org/en/countries/bahamas/bahamas-and-the-idb,1035.html. Last accessed May 2013

Recognizing P2's interactions with the local programmer, it became interesting for the researcher to probe why and how such actions came to be. P2's explanation indicated that the school experienced challenges with EMIS provided by the DoE and as a result the expertise of a local programmer was sought.

> *In administration when we knew that EMIS was down so we seek the services of persons who had the expertise in creating the software. They came in and gave us a demonstration and showed us what the programme is all about. At first they asked us what do we want the programme to do and we told them and they came up with the programme (P2, 3:5).*

From P2's explanation it is also noted that the decision to seek the service of a local programmer was a collaborative administrative decision. In this sense the principal was not acting alone but acted with the support of the administrative staff. Although the actions of the administrative staff were collaborative they contradict the national EMIS initiative. Whilst the administrative staff acted contrary to the DoE's initiative, there seemed to be a sense of pressure associated with completing their work. Thus, P2 indicated that the services of a vendor were sought '*because EMIS was down, we could not access EMIS and time was not on our side'* (P2, 3:17). The pressure to complete administrative work seems to be associated with the DoE policy on school reporting, and perhaps, the authoritative environment of the education system (see discussion in chapter 2). This pressure seemed to require decisions that challenge the traditional organizational structures when supporting EMIS that was initiated by senior leaders. Such decisions, Thompson (2010) argues, principals take at their own risk.

From P2's experience, one question lingered as to why the services of the project team were not sought especially since these persons were appointed by the DoE to support the

implementation of EMIS. The answer to this, perhaps, could be found in P2's attempt to find EMIS booklet.

> *. . . when I came here they told me of a booklet that was here that deals with the timetabling. I don't know of any of the schools who are using that booklet or that programme to do timetabling . . . I haven't seen the booklet yet, but they told me that it is here (P2, 2:27).*

P2 refers to EMIS software manual that guides users on how to operate the system. From this manual P2 expected to gain knowledge on how to operate EMIS to construct a timetable for the school. It is interesting to note that P2 made no mention of contacting the project team or the DoE for the booklet as they would have access to it, if it existed, and the knowledge on how to use EMIS to construct timetables. On the one hand, P2's interest in the booklet to construct timetables seems to support the DoE's expectation of EMIS (discussed in section 2.3.2); on the other hand, pursuit of that interest appears to be faint since he relied on information provided from '*they*' and not the DoE or the project team.

Conflicting views on the purpose of EMIS

P2's view of EMIS seems to be different from the expectations DoE outlined in the memo (see section 2.3.2), and as he led the implementation of EMIS, his leadership in the school was hindered. His understanding seems to indicate a tension between leading EMIS and leading student learning. Thus, he struggled as to whether he should focus his attention (and the resources of the school) on EMIS or on the instructional programme of the school. This struggle seemed parallel with the arguments of Sander et al. (2005) with regards to the impact of technology on school resources and the considerations for deciding whether to use school resources elsewhere. As P2's conflict unfolded the two areas competed for his leadership,

focusing on EMIS and focusing on the instructional programme. This resulted in him being extremely critical of EMIS contribution to the school.

> *. . . the technology in terms of implementing the grades, yes. But when we're talking about producing skilled labourers, the technology within those areas, if used it can be good. Those kind of focus needs hands on, not sitting in a classroom behind a desk and chair looking at a white board. When you are talking about producing a skilled mason, carpenter or electrician, some of that is needed, yes; but the majority of the time has to be spent with hands on (P2, 5:20).*

Although P2 recognised the contributions EMIS offered to administrative activity, his response seems to indicate that focusing on the technology challenges what could be regarded as his description of learning relevant for students. As P2 viewed EMIS based on what he understood it offered to student learning, he points to a leadership struggle principals grapple with in deciding where to focus their efforts. In this sense, a struggle exists between focusing on student learning and EMIS: both roles placed high demands on his time and resources. The leadership struggle seemed to press upon him to be bold in supporting the programs he deemed relevant to the school.

> *That's why I told the people I am going to be bold enough to implement masonry and carpentry in this school at a level where once these kids leave this institution they automatically become marketable. When they leave this institution they can go out there and work and not have to wait around (P2, 5:13).*

P2's experience points to the complexities involved with EMIS in the context of the school where disagreements exist within leadership roles for responding to national initiatives or local needs. P2 seems to be a reflexive subject acting in the current context as a school principal shaping and being shaped by personal values, the cultural, social and technical

issues surrounding EMIS. Meshed in with his leadership activity are emotional impulses of confusion and anxiety, particularly when deciding where to direct the focus in the school.

5.2.2 P2's understandings of EMIS contributions

Reflecting on the contributions of EMIS, P2 recognised that some of the written work associated with reporting data was reduced.

> *It eliminates a lot of pen work by the teachers; it cuts down on time because all they have to do is go into the system and just press the button (P2, 3:41).*

The reduction in written work was perceived to be a benefit to teachers since, according to P2, they need only to press the button. The reduction of pen work and the saving of time can be seen as enhancing the workplace which is in line with the expectations of the DoE (see section 2.3.2).

Another contribution of EMIS perceived by P2 is associated with the access afforded to parents to see their child's grades.

> *What is good is that parents are able to go online and see what is happening with their child at school (P2, 3:40).*

P2 recognised the online access available to parents who log into EMIS to view their child's school performance. This contribution is not directly associated with DoE policy, however it was perceived as being a desirable feature and good for parents. Although this contribution is limited by parents' ability to access the web, it facilitates interaction between parents and the school in a way not hindered by location or time.

P2 recognised the contributions of EMIS to the transcripts retrieval process.

> *. . . it [EMIS] cuts down on time wasted when someone comes in for a transcript but we still have to pull report cards and look at these reports for three years. Whereas that should be inside the system and you just go and put the child's name in and say transcript and it creates a transcript (P2, 4:11).*

Although P2 recognised the time saving capacity of EMIS, he expressed frustration with the fact that the technology requires the traditional process and the new electronic process when retrieving a transcript. The finding supports the arguments of Bhatti et al. (2013), which challenge assumptions that data generated by EMIS are readily integrated into administrative practices. P2's understanding seems to indicate that data produced by EMIS needs to be relevant for administrative processes with regards to the steps associated with producing and retrieving the data, and the input and output information associated with the data. P2 spoke of the steps associated with producing a student transcript.

> *Right now if you want a transcript you still have to go down to guidance and they have to pull this and look at it and type it in. EMIS is supposed to be able to do that. You're supposed to be able to go to the programme put in the person's name, say what you want done and it present you with a transcript, but that's not happening (Principal 2:3).*

P2 realised the ability of EMIS to retrieve students' grades and the challenges associated with producing student transcripts. Although EMIS produced transcripts, P2 seems to refer to the fact that the presentation of the transcript was not considered acceptable. This is due partly to the way in which EMIS prints transcripts. In EMIS, the printed layout of the transcript differed from the culturally accepted layout that P2 was accustomed to. This difference

caused the transcript produced in EMIS to be unacceptable[27]. Whilst Bhatti et al. (2013) recognised the challenges for EMIS in producing data for the different data users in the education system, the findings from P2 indicates the need to focus on the different input/output variables associated with producing the data. Such a focus contributes to the efficient retrieval and the usefulness of data.

P2's concern with EMIS went beyond the data produced by the technology to concerns about the technology being relevant on a national level. For him, the extent to which EMIS was being implemented was unacceptable, and he believed that the national implementation process needed to be reconstructed.

> *. . . pull back and start all over again in terms of educating these persons as to the use and what you want implemented into the schools as it relates to EMIS programme (P2, 4:18).*

As P2 considers the national EMIS implementation, his concerns seem to echo that of Powell (2006) which call for rethinking of EMIS. Recognizing the amount of funds invested in EMIS and the results from that investment, P2 suggested that the national implementation strategy should be restarted. What P2 desires to see is that:

> *. . . the entire EMIS system be implemented not just aspects of it; the retrieving of the transcript, the creating of the timetable and not just the focus on posting of grades and creation of the report card (Principal 2:6).*

[27] The presentation of national reports is important to the way in which public documents are represented. Unfortunately, the MoE made no plans prior to the integration of EMIS to ensure that the layout of the reports were culturally acceptable.

The existence of the master timetable, attendance books and lesson plan books (Appendix-D and Appendix-E)[28] give evidence that the traditional process of recording students attendance, storing student demographics and tracking students are still in operation.

5.3 Overview of P3's leadership

P3 is a principal at a junior high school with 7 administrators, 64 teachers and 3 administrative staff members, and student enrolment of 1122 (DoE, 2011a). Although she had been an administrator in the education system for over 10 years, she had been a principal for 2 years and this was at her current school.

P3 is a principal with a keen interest in the instructional programme of the school. This is noted in her reflection on her greatest accomplishment in education.

> *I feel at senior level when we were able to introduce the BGCSE programmes to the high flyers in grade 11 rather than waiting for them to go to grade 12 and seeing them really succeed rather than holding them back to wait to do it in grade 12. That was a project I started in the 2005 school year at [School-A] before I came on to [School-B]. The majority of the 11th graders who wrote five subjects got A's and B's rather than C's (P3, 1:9).*

Her understanding seems to be associated with students' academic performance in national examinations. This finding is consistent with the discussion in section 2.4.2 that emphasizes the management of the instructional programme. P3 feels that the national structure of the education system is holding students back with regards to their performance in national examinations. She believes that students should be allowed to take national examinations

[28] The appendices show pictures of the documents posted on the wall in the offices of principals and in the hallway of the administrative office. As principals need information on the location of students or class, the Master Timetable posted on the walls, in the halls or in the offices is referred to.

when they are capable academically regardless of their grade level. When reflecting on another school's instructional programme she expressed keen interest in implementing a similar programme at her school but seemed challenged by the lack of qualified teachers.

> *I feel we are really holding our kids back too much. What I'm hearing now from [School-D] I'm really happy about. Ms. [Principal of School-D] started two BGCSE at grade 9 and all their BJCs in grade 8. When I came in here I thought about the same thing but the problem is finding teachers that would have the BGCSE background to start my grade 9 on the pre-BGCSE (P3, 1:14).*

She is a firm supporter of students' academic performance and believes in allowing them opportunities to excel in their educational pursuits. Not allowing students the opportunities to progress through the education system in line with their academic accomplishment is placing them 'at a disadvantage' (P3, 1:20). She feels that supporting student is necessary for them to have the 'focus and study patterns' when they enter college (P3, 1:23). P3's interest in the instructional programme seems similar to that of Cleare (2011) with regards to focusing on the instructional programme to support student's development for university.

P3 has a positive view of technology and uses email frequently to communicate with and send data to her district superintendent (P3, 1:32, 35). P3's use of email called into question the data handling procedures of the education system, particularly since she was sending student data to the district superintendent via email instead of relying on EMIS. This practice seems to support arguments that indicate a lack of formal procedures for sharing electronic data in education systems (World Bank, 2011; Bhatti and Adnan, 2013).

5.3.1 P3 and the implementation of EMIS

P3's initial involvement with EMIS began at her previous school where she held a vice-principal position with leadership responsibility for the technology in the school. Her level of use with EMIS was the most advanced when compared to the other participants in the study. She worked closely with the project team and had several personal training sessions where she became familiar with the operations and features of EMIS.

Operational knowledge of EMIS

When P3 came to her current school, she noted the quality of the technical infrastructure, that is, the existence of a functional network, a computer lab for teachers and wireless hotspots throughout the campus. However, she noted that the administrative aspect of EMIS had not been adequately set up, since some relevant student information was not inserted (P3, 2:21). When reflecting on EMIS in her school she stated '*I feel in EMIS we could have been doing more at this school*' (P3, 1: 37). Her response reflects her personal beliefs with EMIS and the collaborative approach she held for the implementation process. Throughout the interview she expressed a sense of disappointment about how EMIS was being implemented in her school. The understanding she held about EMIS was found to be associated with her previous involvement with the technology at another school.

> *. . . at [my former school] we were placed in the teachers register and the teachers were checking the students. And all of that information was already in, that has not happened here yet. We are still a little bit back (P3, 1:38).*

P3's previous work with EMIS facilitated her understanding of the technology. She was concerned with how and at what levels the technology should be used. Her operational knowledge of EMIS supports the findings of the literature about goal requirements needed for

successful technology leadership (Voigts, 1999; Wicander, 2011). The knowledge and understanding she possesses with EMIS differs from researchers about leaders' lack of understanding to improve schools with technology (Creighton, 2003; Shuldman, 2004; Bisaso et al., 2008; Visscher et al., 2008; Seneca, 2008; Chitolie-Joseph, 2011). Whilst Seneca (2008) argued that a struggle exists for leaders in identifying the 'knowledge-base' needed to manage technology in the school, P3 seems to reflect the knowledge needed for EMIS and, although her school is not at the level she expected, she developed and shared personal insights on using EMIS.

Emphasis on training

P3 supported EMIS by placing high importance on training. Her leadership strategy to improve working practices to support EMIS involved training for her personal use, for her administrators and for her teachers.

> *What I did was I sat down with Mr [teacher-D]. I look at him as the IT person even though he is still a teacher, because he knows more than most of them. I said to him, as we do registration our children are coming from our feeder schools that do not have the system and so what I need you to do is train the clerical staff. Every time you register a child, don't wait to give me a list of names, you put the child in the system. So it will make it easier when I come back. I told him it is quite easy to put children into classes once they are already in the system. And when we come back we can go ahead and make the children's schedule before they come in. Once we have them in the system we can just sort them according to grade level and the teachers can have the automated class list ready for them when they come in August (P3, 3:25).*

Although the training P3 spoke of was based on her perceived need, she used it to steer the focus of the school's project team toward how EMIS is to be used during the registration

process. As P3 adjusted the registration process and reorganized her staff members in that process, she adjusted leadership in her school and supported the directive outlined by the DoE in the memo for EMIS (Appendix-A). Her understanding seems to differ from the arguments that suggest leaders are not willing to share leadership roles (Blase, 2004; Hatcher 2005; Danielson, 2006). Whilst Hatcher (2005) notes the tendency of heads to reduce leadership roles to a minority of the senior staff, P3 shares leadership roles with non-senior staff members.

P3 devised a training strategy for how the school's project team would handle EMIS. This involved a collaborative effort between the school's EMIS team and the DoE project team, a process she found to be problematic.

> *I did the unforgivable. I invited [project team member-B] in and she really caused problems for it, even though she worked with me on the weekend. I brought her in because I knew she had worked with you and she knew the stuff. I handpicked four . . . teachers to work along with Ms. [project team member-B] to update data when I first came. I gave them a stipend for doing the work and then when Ms [project team member-A] found out about it she had a problem (slight laughter) (P3, 2:36).*

Although P3's vision for EMIS is associated with her personal experience, it was accepted by the school staff members. By personally selecting staff members to provide leadership, P3 distributed leadership and managed her vision of EMIS through teams. Her plan to rid the school of what she describes as a '*flawed*' performance with EMIS involved inviting project team member - B to lead and train staff members in setting up student demographics and schedules in EMIS. This hands-on training took place at the school outside the normal working hours and individuals involved were given financial compensation.

Although the bureaucratic structure of the education system in The Bahamas supports the flow of leadership through organizational structures (see section 2.4) it challenged P3's access to training and complicated her efforts to implement EMIS.As P3 attempted to acquire the technical support she felt was needed, her efforts conflicted with the organizational structure of the DoE, which she overcame by secretly communicating with one of the members of the project team.

> *Ms [project team member - A] (sign), Ms. [project team member - A] came here the other day when I was having a problem and she had me all mix up and did not solve the problem. When she left I called Ms [project team member-B] (laughter) so (P3, 3:4).*

Since project team member - A was considered the leader of the project team, P3 had to carefully handle her interactions with the team to avoid damaging her relationship with the project team altogether. By contacting project member-B when project team member - A left, P3 avoided undermining the leadership of project team member-A. Through her mode of communication she overcame adverse reactions to her interactions with project team member - B. P3's understandings highlight the challenge of leading EMIS in the bureaucratic organization structures of The Bahamas' education system, which counteracts the implementation process. For P3, getting the necessary training did not fit easily within the existing processes and structures of the education system. Although her mode of communication was at odds with the existing organizational structure of the DoE, it supported her implementation of EMIS. One of the possible explanations for P3's conflict with the project team is perhaps the compensation she gave to individuals working on EMIS. Viewed in this light, P3's 'stipend' supports the arguments of Spillane and Camburn (2006)

with regards to the challenge to leadership when team members receive extra money for work activities and others receive nothing.

P3's regard for the importance of training is noted among EMIS researchers (Sarwani, 2003; Wako, 2003; Powell, 2006). Although Wako (2003) views training as an ongoing practice arising from a national office, P3's understanding indicated that training emerges locally from her perceived need for training, and the staff's indication of a training need. The training at P3's school was designed to meet a specific need, and thus, once that need was met, training was no longer required.

P3's vision for EMIS

P3's vision for EMIS was not limited to her staff members. She also shared her ideas of what information she felt was needed from EMIS with the project team.

> *I was telling [project team member - B] for statistical data from the system, for example homeroom performance of the school. I should not have to pick up a broad sheet from teachers. I should be able to go to the system, look at each grade level, see what they did this semester, pull up the Christmas term and do a comparative analysis of the two terms; looking at improvements and places where they would have fell down. From this I would be able to strategize on what I need to do in this [subject] area to upgrade [improve]. That's the way I see it (P3, 3:10)*

P3's vision included practical examples of how she understood EMIS should work for her, and how she would make use of the data she pulled from the technology. P3's vision for EMIS supports the argument that leaders should have a clear vision for EMIS with realistic expectations (Cassidy, 2005). Although the realization of EMIS vision takes time, whether P3 would be able to experience the realization of her vision is threatened by the DoE's intent to switch software providers.

> *But will we keep EMIS. Let me tell you why I'm saying it. When the Minister met with us in July of last year, he asked all of us to go to [school-A] and take a look at [software-A]. And so, my concern is will they keep EMIS (P3, 4:26)?*

P3's awareness of the possibility of replacing the current EMIS vendor affected her leadership efforts. Whether she would be able to follow through on her vision for the technology is questionable since she was reluctant to make further plans in the midst of concerns that the technology could be replaced. How P3 positions herself in her response seems to indicate where the ownership of EMIS lies: for her it seems to be with the DoE. This impacts the 'perceived usefulness' of the technology (Sarwani, 2003; Powell, 2006; Chitolie-Joseph, 2011). P3's understanding seems to support the arguments of Powell (2006) with regards to the political short-term commitment to EMIS within developing countries, which he argues are associated with the bureaucratic procedures supporting the process.

During the implementation, P3 experienced several conflicts associated with the working practices teachers developed with the technology. For example, she was challenged with getting teachers to insert data into EMIS in a timely manner.

> *We just had the staff briefing today where we still have grades missing from grade nine reports and we cannot complete grade sheets (P3, 2:7).*

P3 noted how the missing information hindered the school's administrative practices.

> *If all that information was in the system, if teachers were forced to make sure that the system was up to date; for example, if they know that Ms. [Administrator] will check tonight if I don't have my grades there may be some forms of penalization where you get a letter or something to say you did not meet the deadline, I feel they would be doing more (P3, 2:8).*

Whilst Voigts (1999) noted the importance of clerks with regards to inserting data into EMIS, P3's understanding indicates that teachers are primarily responsible for inserting data into EMIS. This suggests a need to coordinate the handling of data at the school level. From P3's experience, such coordination would be based on existing practices associated with the school calendar (DoE, 2013) and principal's leadership of staff members in these practices. P3 experience with data handling differs from the arguments of Wicander (2011) in the study of Ghana's EMIS. Whilst Wicander's study noted a lack of motivation among leaders for data entry and for the use of the data in school leadership practices, P3's understanding indicates a strong sense of interest for and the use of data. This interest is noted by her awareness of how the data would be used in the school and a plan to ensure that teachers perform data entry in a timely manner. In fact, interest in the handling of data seems to show high levels of motivation since she express an interest in using her organizational authority to 'force' teachers to keep the data entry up to date. She explains how she used EMIS as a monitoring mechanism to ensure teachers insert the data.

> *The lazy teacher who would have waited to the end of the term to pick up a child's book to say 'I'm collecting all of my grades' know that now every week I'm looking into the system. What I normally do if I go into a teacher's grade book and I don't see grades entered, first I speak to you and next week I give you a letter. No teacher wants to see anything in black and white. That is negative so you have them entering the grades (P3, 3:3).*

P3's characterization of the teacher as being 'lazy' points to two areas. The first is associated with assumptions that the implementation of EMIS is widely accepted and that staff members are willing to work together to facilitate its implementation. P3 indicates that not all staff members are eager and willing to use EMIS, and that staff members have agency to complicate the implementation process. This means that leadership is necessary to address

the social interactions existing in the local culture to support the implementation of EMIS. The second point of P3's characterization of the teachers as being 'lazy' is associated with the professional practice existing in the local culture. Inserting student assessment scores into EMIS requires teachers to administer students' assessment, mark the assessments, insert the marks into the manual mark book and then insert the marks (see section 2.4.2).

P3 seems to overlook the complexity associated with teachers inserting students' assessment scores into EMIS. This complexity points to a dilemma principals are faced with when leading the implementation of EMIS. On one hand there is a need for more effort from staff members and for efforts to be organized to support the technology. On the other hand, however, the need for more effort from staff members is subjected to the organizational process and policy of the education system (BUT, 1994; DoE, 2004). Thus principals are challenged and at the same time restricted in what they can do.

P3 resorted to monitoring as a way of leading teachers through the implementation of EMIS. Her reliance on monitoring to check teachers' activity in the system is found to be associated with a bureaucratic approach. Thus, instead of providing incentives or collaborating with teachers to develop their own interest to meet the commonly accepted objectives, P3 relied on organizational power to corral teachers' activity with EMIS. This meant that P3 had to develop new rules in the school for working with EMIS, one of which placed '*demands on the amount of grades that teachers would have for students during the term*' (P3, 4:33). P3 sees this rule as a way of ensuring teachers' timely insertion of students' grades and a way of improving upon teachers' delivery of the instructional programme, specifically with regards to the amount of time spent on each topic.

5.3.2 P3's understandings of EMIS contributions

When reflecting on the contributions of EMIS, P3 noted the assistance in supervising teachers' recording of students' grades (P3, 4:11). For her, EMIS facilitated improvements for teachers' timely marking of students' assessments and the timely insertion of assessment scores into the mark books.

As P3 continued in her reflection, she resorted to a visionary approach and expressed interest for other programs to be included in EMIS; such programs included standardized testing and instructional programmes for student development and exam preparation.

> *I don't know what other programs can be attached to it the [EMIS]. I was asking Ms. [project team leader-B] if the standardized testing, like how you do SAT could be added. We could set up a system where teachers coach children into an exercise; similar to the software programme at [school-C] where children actually go on and practice prior to examination taking period. I don't know if it can come on to the [EMIS] (P3, 4:14).*

During the interview, P3 repeatedly made reference to EMIS in relation to the instructional practices of the school. She seemed to value the technology for its potential contributions to enhancing how she manages student performance.

When reflecting on the contributions of EMIS with regards to her leadership in the school she mentioned the DoE's involvement with regards to managing records.

> *We could use it for the same statistical data on teachers that the DoE keeps sending back and forth for. Every year we do these appraisals reports and because a teacher has applied for a promotion we have to go back and photocopy all these forms again like we did not send them in (P3, 5:2).*

P3's reflections of EMIS contribution points to the limited use the DoE makes of the technology, and supports the arguments of research with regards to the limited use of EMIS by senior management (Sarwani, 2003; Cassidy, 2005; Powell, 2006). P3 seems to indicate that senior management views EMIS as a technology for the school rather than for the national office. P3's reflections also indicate a student focused approach that education officials hold for EMIS.

5.4 Overview of P4's leadership

P4 is the principal of a primary school with an instructional staff of 29, a vice-principal and a senior mistress. The enrolment at the school is 314 boys and 342 girls (655 total students) organized into 19 classrooms. P4 is the longest serving principal in this study and has been employed with the DoE for over 40 years. She has held various leadership positions but has been a principal at her current school for eight years.

P4 is a well-respected principal with a passion for education. This is noted in her philosophy of school, which states:

> *. . . every child is a divine gift endowed with the potential to positively know, establish and maintain a dynamic relationship with his God, his fellow citizens, the environments and himself, thereby positively impacting his world socially, spiritually, intellectually, psychologically, morally and economically without the rights of others (P4, 1R9).*

P4 outlined several goals for the school that focus on physical plant, curriculum development and staff professional development. Of her seven curriculum development goals, four are associated with developing teacher skills and the working environment while the other three are focused on instructional strategies (P4, 5R10). P4 showed high concern for improving

students national examination results and supports the findings of Bahamian education researchers that note the focus on examination results (Collie-Patterson, 1999; Cleare, 2011).

P4 is a strong supporter of stakeholder involvement in the school and works diligently to facilitate positive interactions with parents and the community. As an active participant in the church community, P4 is a firm believer in Christian values and recognizes 'God as the source of all knowledge and strength'. During the school's orientation of 2009, Bishop Kirkland Murphy was invited as guest speaker to provide a motivational talk to teachers for the upcoming academic year (P4, 8R9). Other clergy members including Reverend T.G. Morrison[29] and Pastor Barrington Brennen, are often invited to speak at school events (e.g. PTA meetings, graduations). In her PTA and 'Parents as Partners' meetings, stakeholders are afforded opportunities to plan and participate in school events. The list of stakeholders involved in her school includes banks, private companies, non-government organizations and government organizations.

P4 is also a strong supporter of staff development and allows teachers the opportunity to chart their own personal development activity. In one of the staff development events the researcher was brought in to conduct a workshop on EMIS that she recognised to be needed to help teachers with the 'knowledge and skills necessary to compete in a technological world' (P4, 14R9). P4's strong sense of direction for the school is noted in her focus on the needs of the school and support for stakeholders' involvement in the school.

[29] She regards Reverend Morrison as the spiritual father of the school and relies frequently on his volunteer service.

5.4.1 P4 and the implementation of EMIS

When reflecting on her time as principal, she recognizes her greatest accomplishment as integrating EMIS within her school (P4, 1:18). Even in the midst of the frustrations associated with using EMIS she nurtured her teachers during the processes by '*easing them and making them comfortable in terms of reassuring them it is going to be ok*' (P4, 2:40). For P4, implementing EMIS involved overcoming several challenges primarily associated with inadequate infrastructure, senior management involvement and social cultural interactions.

Incorporating EMIS into the goals of the school

During the time of the interview, EMIS had been in use at P4's school for two years. As she reflected on the early stages she mentions how she led the implementation.

> *. . . every year you set up goals and once you put those goals in place then you have to plan and strategize on how to deal with it [EMIS]. That is how I work with it [EMIS] (P4, 1:36).*

P4 speaks of incorporating EMIS into the school goals. By incorporating EMIS into the school goals, P4 seems to indicate a goal driven type of leadership where she devotes her energies toward a collaborative attempt in achieving those goals (Northouse, 2014; Hallinger and Lee, 2014). This finding supports the arguments for the use of EMIS in supporting existing goals (Powell, 2006; Matemba, 2011; Bhatti and Adnan, 2010). Although P4 speaks of incorporating EMIS in the school goals her principal's reports do not mention EMIS. This means that her goals with EMIS are not made explicit in the school context. Instead, her goals with EMIS and its degree of success or failure were implicit. Since P4 did indicate she had goals for EMIS this lead the researcher to assume that she relied on her interpretation of DoE

memo and the project team's guidance for why and how EMIS is to be used in the school (Sharija and Watters, 2012).

Infrastructural challenges with EMIS

The school used a portable trailer as a staff lounge and as a place for teachers to have computer and internet access. Computers were also available in some classrooms (e.g. usually the grade level leader) but the network was often problematic[30]. Although the need for adequate infrastructure is recognised in order to successful implement EMIS (Chapman, 1991; Powell, 2006; Bisaso et al., 2008; Bhatti and Adnan, 2010), the absence of an adequate infrastructure did not prevent the installation of the system in P4's school.

EMIS was installed on a server, provided by the DoE, and a school administrator was given the pass codes (see section 1.3). The number of computers given to P4's school was not enough for the 29 instructional staff members and instead of relying on the DoE, she relied on her resourcefulness to support the implementation (Edwards, 2015). For example, reflecting on her leadership of EMIS, P4 recalled the early stages of implementation where '*she had to rely on the efforts of school staff and partnership with stakeholders to get the needed computers'* (P4, 1:31). She relied on partnership with corporate sponsors to assist with the provision of computers for EMIS and on the school staff and students to raise funds (P4, 42). Although P4 relied extensively on stakeholders to assist with infrastructure, the stakeholders in place by the DoE offered little or no assistance at all. For example, she spoke about the school board.

[30] A report prepared for the DoE by the researcher during his time as the project team leader outlined the location and amount of computers in P4's school. The report indicated that the school had 10 computers scattered in various classes and EMIS was installed on 7 computers. In addition, the report also noted the absence of a proper networking environment for EMIS and the school's initiative in addressing this challenge.

> *The School Board represents the government in any way, because they are given X amount of dollars in terms of whatever the needs of the school. They were supposed to assist (P4, 1:45).*

She spoke about the PTA.

> *The PTA, yes to a certain extent, but sometimes the PTA can only…. they have their own agenda whereas the School Board is directly focusing on the school. If the PTA says, I want to raise funds to implement this in the school that is what they do. We cannot dictate to the PTA all the time but we can request that if they can assist (P4, 2:5).*

She also spoke of the DoE.

> *. . . let the Ministry know these are some of the needs, not that they can fulfil but they try to a certain extent (P4, 1:32)*

P4's reflection on her activity to acquire the computers needed for EMIS points to an underlying tension with the DoE. This tension seems to indicate her lack of confidence in the DoE for the provision of resources. Although she does acknowledge the DoE's efforts, she seems to recognise the limited availability of resources on a national level but does not regard this as being acceptable. Thus, her interaction with the DoE seems to be one of compliance rather than dependence, especially since she looks past the DoE as a potential source for the provision of resources. This is an important point as even though the DoE introduced EMIS into the schools, it is their support P4 perceives to be lacking.

During the interview, P4 became a bit irritated as she reflected on conversations with other principals with regards to the distribution of resources.

> *In talking, most principals have computer labs and they have this and they have that. But the ones who are working with the [EMIS] . . . to me they have more than me because they have a whole lab I don't (P4, 2:14).*

P4 recognizes that some principals have computer labs in their schools that could be used to access EMIS. The lack of infrastructure challenges her to become more resourceful in providing a way for her teachers to make use of the system. After acquiring additional computers P4 also had to upgrade the school's network and link the additional computers into the school's network[31]. Thus, she used school funds to purchase the hardware (e.g. routers, switches and wiring) and relied on MIS to provide the labour.

Limited infrastructure and controlling environment

As P4 implemented EMIS she was challenged to find ways to obtain the resources needed to support the process. Implementing EMIS placed pressure on her to become a more resourceful leader (Edwards, 2014) to address the infrastructural shortage and to guide the implementation of the system into the school. P4's resourcefulness as a leader with EMIS is noted by her influence in getting stakeholders to use personal resources to support EMIS. She speaks of how teachers used their personal resources at home when working with EMIS.

> *My teachers work more or less on an individual basis from their classroom and some from home (P4, 2:16).*

P4's statements indicate how the lack of infrastructure poses challenges for leaders. Thus, she took on this challenge by relying on her leadership capacity to influence staff members to use their personal resources (e.g. laptops and home computers). The leadership capacity in her case was the ability to convince her teachers to conduct their work without the adequate resources. This meant that teachers had to access a computer wherever they could to insert data into EMIS. P4's understanding indicates how implementing EMIS challenges principal's

[31] The information was taken from the DoE minute paper No.EDU/A/316. A copy of the document is held in a secure location with the researcher.

leadership capacity within the local environment and how such leadership supports the implementation of the system, even when the basic infrastructure is not in place.

Since the directive from senior management to implement EMIS did not include sufficient provision of computers, servers or networking components, the school's use of EMIS were prone to conflicts. One of these conflicts is associated with the level of commitment P4 perceives that the DoE has to implement EMIS.

P4's perceived level of commitment offered by the DoE led to a culture where she openly criticized senior management involvement with the technology. When reflecting on the support the DoE offered to EMIS, P4 compared the its support to an American baseball game.

> *It is just that the DoE on the whole needs to be serious in terms of exactly what they want. They cannot be pinch hitting and selecting here and selecting there. They need to work with the playing field properly and if it is something they want to do nationwide, then do it (P4, 2:19).*

P4's response shows the open criticism towards the DoE's lack of support and calls for appropriate commitment and investment from the DoE to ensure the technology works well. In this sense, she desires senior management to be responsible for the ongoing support needed for EMIS at the school level. Her comparison of the game played with senior management seems to support the arguments Thompson (2010) makes of principals having to play games when involved with policy processes. She notes that principals make the decision to play such games at the risk of their position.

P4's understanding seems to indicate that implementing EMIS in controlling environments restricts the capacity for effective change. This point is noted by her request for more autonomy to find ways that will enable EMIS to be more useful.

> *It may be difficult, but if they give principals the autonomy to think out of the box. Give us that opportunity, to think outside of the box. If this can work for us then allow us to do it (P4, 2:22).*

P4's response seems to indicate her belief of being able to manage EMIS without the involvement of senior management and the organizational arrangements that restrict her. The request reflects the tendency found in the Bahamian context where principals are reluctant to make major school decisions on their own for fear of making one that does not meet senior management approval, and then get reprimanded or blamed (see discussion in section 2.4). Instead, principals await directives from senior management for almost every major school decision and express their views when the initiative causes conflicts.

P4's request for autonomy seems to come from a desire for greater control so that she could exercise her leadership capability over the implementation process in the school context. Her request seems to support the arguments of Thompson (2010) with regards to principals' appeal for more control. Thompson (2010) argues that principals' request for more control is a 'misrecognition' that is historically rooted in the education system. In this sense, P4's request for autonomy is a failure to see that her request supports EMIS and keeps the education system that restricts her leadership with the technology intact.

EMIS in parallel with existing practices

One of the crucial understandings P4 had of EMIS was to regard the technology as a 'supplement' (P4, 4:2). As a 'supplement', she considered that the data contained in EMIS should be used in parallel with existing data practices rather than replace those practices. Thus, her teachers were required to insert data into EMIS and maintain the traditional manual books that contained the same information. Encouraging EMIS as a supplement differs from

the *workplace enhancement* aim of senior management (discussed in section 2.3.2), and contributes to the duplication of work (Sarwani, 2003; Powell, 2006; Matemba, 2011; World Bank, 2011). Although Powell (2006) notes that such duplication is associated with a 'lack of confidence in the data produced by the system', P4's understanding seems to indicate that the duplication is associated with a lack of confidence in EMIS data backup practice. When P4 was asked whether she still checked teachers' manual records she responded:

> *Yes, for backup. I keep a manual in case something goes wrong with the system. You know we tend to have something off and if the system is not working you need a backup. You need to have a backup plan, there has to be something rough. I would not throw out the hard copy of the mark book (P4, 3:43).*

Backing up the data in EMIS was the responsibility of the project team and was carried out by using an external drive. The schools did not have a backup plan of their own and they relied on the project team to provide guidance in such areas (see section 1.3). P4's 'lack of confidence' in the data backup practices contributed to her perception of EMIS as unreliable. Since P4 was not familiar with EMIS backup procedures, her 'lack of confidence' seems to be associated with the bureaucratic environment in the education system that emphasizes duties and responsibilities (see section 2.4).

P4 confirmed the primary use of EMIS is the production of the school's end of term report cards (P4, 4:10). This process relied extensively on the communal effort of staff members (discussed in section 2.4.2). Using EMIS to produce the end of term report cards at P4's school involved the secretary and the project team setting up the administrative aspects of the system. The project team provided support as the secretary inserted teachers' and students' demographic information; students and subject teachers into the classes; supervised subject teachers' insertion of students' grades; and printed the final report. In addition, subject

teachers inserted students' assessment grades into the respective classes and 'released' grades to the office. When P4 compared the traditional report card process to that of EMIS, she perceived that EMIS made the grade calculation aspect of the process easier.

> *With the mark book teachers had to put in the class grade, the exam grade and then calculate the final grade. The same thing has to be done with the [EMIS]. The difference that makes it easier for persons using the system since the [EMIS] does all the calculations. Teachers just put in the grades and the [EMIS] will do all the calculations, all of the summary and all the GPA. Yes during this process, sometimes teachers make mistakes and the administrator has to go back and revisit what was done. I think with EMIS the time balances out because to put the marks in the mark book teachers still have to key the grades in (P4, 4:20).*

P4 indicates that EMIS provides a degree of convenience to users with regards to the grade calculations. Such convenience reduces the time subject teachers spent on calculating students' grade averages and supports senior management's expectation of the system (discussed in section 2.3.2). Although such a reduction in time would appear beneficial to the entire report card process, the benefit was only found to be associated with a particular aspect of the process since administrative challenges emerged when teachers made errors inserting students' grades. Such errors, she perceives, counteracts the convenient, time saving aspect of EMIS. P4's understandings point to the complexity associated with performing school administrative practices where a single practice (e.g. producing report cards) is associated with many interconnected activities. This means that although EMIS offers benefit to aspects of the schools' administrative process, such benefit may only be attributed to part of the entire process.

5.4.2 P4's understandings of EMIS contributions

When reflecting on the contributions of EMIS, P4 noted the processing speed of the technology assists her when preparing her 'principal's report'[32]. Preparing the 'principal's report' required compiling statistics on the school performance throughout the year. For P4, EMIS enabled this report to be quickly compiled (P4, 3:27). Thus, as information for the principal's report is easily generated school records are managed more efficiently. The speed EMIS brings to administrative function, as noted by P4, is a common finding among researchers with regards to technology (Voigts, 1999; Sarwani, 2003; Wicander 2011). P4's view of EMIS contribution seems to be associated with a technical view (Carrington et al., 2010; Hiltz and Dexter, 2012) and is found to be similar to DoE assumptions with regards to the functionality of technology where schools are expected to become more 'efficient in handling data' (see discussion in section 2.3.2).

According to P4, another more challenging contribution of EMIS seems to be associated with having to implement rules for teachers to work with the technology and then managing teachers in those rules. This finding is similar to the arguments of Seneca (2008) with regards to the challenge leaders have with when implementing technology. He argues that technology requires changes in school standards, and, as such, poses challenges for leaders to reach beyond their comfort levels into levels where there is a lack of preparedness and resources.

[32] 'Principal's report' is the document the DoE requires principals to prepare at the end of the school year and summarizes activities occurring in the school throughout the year. It also identifies the school's goals and outlines how the goals were achieved. Included in this report is the average GPA for the school as a whole. Principals spend hours preparing charts and graphs to present the information the DoE requires in these reports.

P4 noted that EMIS contributed new avenues of communication between teachers and parents. She perceives that such avenues of communication are a benefit for parents in monitoring the performance of their child.

> *But it is better with EMIS because parents can go on line with their codes and view their children's progress and behaviour during the course of the year. For example, when the teacher puts in a comment for the child that's having a behaviour problem and the parent views that comment they will find their way to the school to see the teacher. So it opens up another door of communication with teacher and parent (P4, 4:20).*

Reflecting on the contribution of EMIS, P4 perceives that the technology helped the school on a professional level. She noticed that the system increased the level of security when recording students' grades.

> *If the teacher changes their mind they would have to go through a lot of work. For example, if they change their mind and say they should not have given the student a D for class work and want to make a change to give the student a C, it would not be easy for them to make that change. It is possible for them to change it but the time and effort they have to put in to make that change is a deterrent (P4, 5:29).*

Whilst discussions of EMIS with regards to security of data tend to adopt an external view, the experience of P4 offers a contribution for consideration for an internal view of data security. Such a view involves accurate recording of school data and deterring unwarranted changes by those inserting the data.

P4 perceives that EMIS has also contributed to challenging her teachers beyond the traditional.

> *To me technology helps the teacher to move from the traditional. Not saying that we don't need the traditional but if we are looking for growth it has to be growth all over. When we talk about growing, there has to be growth (P4, 5:35).*

In addition, P4 perceives that EMIS has taken the school 'a few notches up'.

> *What we are doing here a lot of other government schools are not doing. So it has placed us on the map as having technology and lined us up with the private schools. One parent who has a child in the private school was saying that she could stay at home and see her child's reports. I said to her you can do that with a child at this school. Her response was, 'that school'. I said, yes we can do that too. So you know how some people expect you to be at a certain level. Well having this technology confirms that we are at that level (P4, 5:19).*

When asked about what she would like to see coming out of EMIS, she responded:

> *The education officers and the subject officers need to get their curriculum and put it on EMIS. They need to add that to the vision. Too many times these officers say the teachers have to work your scheme for the year but then they say the curriculum is supposed to be upgraded. That was five or six years ago and every year they are saying the same thing, so get it right. Put it on EMIS or however they want to do it and allow my teachers to do it also (P4, 5:43).*

Her response indicates that the DoE officials are not accessing the information in EMIS. The finding seems similar to the arguments of Powell (2006) with regards to senior management's lack of commitment to data produced by EMIS. The limited use of the system questions the arguments that EMIS is designed for use by decision makers. P4's understanding of EMIS seems to indicate that implementing the technology makes progressive steps toward modernization where the system's purpose is more associated with its existence rather than its usefulness.

5.5 Overview of P5's leadership

P5 is the principal of a junior high school with 97 teachers, 3 senior administrators (e.g. vice-principal, senior mistress and senior master), 10 administrators and 19 support staff. The student enrolment at the school is 1,370 pupils.

P5's view of schooling is to provide a positive learning environment and educational experiences where each child has the opportunity to develop personal, academic and social skills that will help them to become intelligent and productive citizens (P5, 2R). As such, her school's mission is to equip students with the skill, beliefs and attitudes that will enable them to function competently and make a meaningful contribution to society. She believes that her school's purpose is to provide a safe and caring academic community that stresses self-respect and respect for the rights of others (P5, 2R).

P5's reflection of her most memorable accomplishment as the principal indicates the strong interest she has for the development of students' reading and behaviour.

> *My most memorable accomplishment was to see some of the children we had with low reading levels upgraded. We did this through the fast forward programme which used technology, even though it cost us an arm and a leg. Since students love to go on the computer their behaviour changed. I was glad to see that we actually had behaviour improvement and reading score improvement. . . The fact that it was something enjoyable and at the same time got across the concept of improving students' reading comprehension and vocabulary skills made it memorable (P5, 1:8).*

P5's school is known for its academic accomplishments and the students are often found in the media winning awards and being involved in national celebrations.[33] Despite the recognition, P5 identified two primary areas of weakness in her school: the large enrolment of students, and the low level of parental involvement (P5, 53R). In her view, the large enrolment of students contributed to increased acts of violence, 543 were recorded in the 2009 - 2010 academic year. Some of the acts of violence included fights, possession of weapons, possession of drugs, burglary, rape, assault on staff and destruction of property. However, fights were the most frequent at 83% of the acts of violence, destruction of property at 9% and gambling at 4% (P5, 63R). One of the more recent acts of violence involved a teacher's attack on a student.[34] The acts of violence in public schools have been an area of concern (see discussion in section 2.4).

In the midst of her challenges, P5 displayed a strong sense of direction for the school and an ability to focus on the needs of the school instead of being hindered by the challenges imposed by the large enrolment of students. The message of perseverance was evident throughout the interview and her strong sense of duty is demonstrated by her commitment to her staff and efforts to support EMIS. Even in the midst of frustrating situations she insists on nurturing her teachers during the change process.

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[33] For more information see MoE publication '*ED News / Weekly Tidbits*', 5, 9. Available at http://www.bahamaseducation.com/PDF/Publications/EdNews/2012/March/March%20%2012%202012.pdf accessed March 2014. See also bahamaslocal.com headline February 18, 2013, 'S.C. McPherson Junior High honours its students Bahamas Information Services' Found at http://www.bahamaslocal.com/newsitem/66655/SC_McPherson_Junior_High_honors_its_students.html accessed on June 2013 and thebahamasweekly.com headline February 25, 2014, '*Honour Roll students of S.C. McPherson Junior High School call on Governor General*' Found at http://www.thebahamasweekly.com/publish/bis-news-updates/Honour_Roll_students_of_S_C_McPherson_Junior_High_School_call_on_Governor_General33440.shtml accessed on March 2014.

[34] For more information see the ZNS news report at http://www.youtube.com/watch?v=MNgoRZVbKEI accessed March 2014.

During the time of the interview, P5 was in her first year as principal. Although she had only been the principal for a short period, she had been in a leadership position as vice-principal for several years at her current school and had become acquainted with the school's working culture.

5.5.1 P5 and the implementation of EMIS

P5 relied on the DoE's assistance in setting up an additional networked computer lab.

> *I must commend the Ministry because they have done a whole lot in assisting us. The Ministry sent a gentleman who reorganized our internet wiring and established our second computer lab. So now we have two fully functional computer labs with at least about 40 – 45 computers (P5, 2:16).*

Although P5 expresses appreciation for the additional computer lab, she confirmed that the primary users of the lab were students.

> *Mostly students, but teachers do use the labs especially when we are doing EMIS. Teachers have the teachers' resource room and this room is my focus for next year, to put a few more computers in there so the teachers would not have to utilize the students' computer lab, they can work from the resource room (P5, 2:21).*

With students as the primary users of the computer labs, teachers are limited in their access to EMIS (discussed in section 2.3.2). P5's plan to provide additional computers for teachers indicates her recognition of the importance of infrastructure and her forward thinking to address this challenge. This suggests that supporting EMIS requires P5's awareness of the needs of her school with EMIS.

P5 confirms that the primary use of EMIS was for the production of the school's end of term report cards (see section 2.4), and expresses interest in the additional features of the technology.

> *Right now all EMIS is being used for is to generate report cards. But I have been reliably informed that it has other features. They are the features that I would really like to see developed so that we can use. I would like to use the attendance register so we can move away from all this paper work. The attendance can be done on EMIS. Now that means that we would have to have computer software straight out across the entire school so that we can use the attendance register. I would like to see punctuality also included also the children's photo so we can identify the child. I would want to have parents tap into the system and see what is happening with their children and to see some of the work being assigned. These are some of the things that I would really and truly like to see us move toward. Manpower could be used for more instructional purposes, instead of all this record keeping and manual work (P5, 1:27).*

In giving an example of how the technology could be used, P5 indicates her understanding of how EMIS could benefit the school. However, the extent to which P5's intent with EMIS is realised remains questionable since it requires revision of the organizational process associated with recording student attendance. This means that, although EMIS has the feature to record student attendance using the technology would not eliminate the manual recording of student attendance since teachers are still given a manual copy of the attendance register to complete. Thus, using EMIS would be an addition to the student recording process. Also, student's attendance is recorded by homeroom teachers in their classes during the registration period (discussed in section 2.4.2). The availability of computers and location of the computers becomes pivotal for the process of recording attendance. This means that without

access to EMIS (e.g. computers, networking) in every teacher's homeroom it would not be possible to record students' attendance (see discussion in section 2.4.2).

Challenges with EMIS accepted

EMIS had been installed into the P5's school while she was an administrator. During this time EMIS encountered infrastructural challenges and the staff had developed a process for dealing with these challenges. For example, the school experienced frequent power shortages which had become commonly accepted. When a power surge shortage occurred the operation of the server was affected and a member of staff would go into the administrator's office to reset the server and router. This process became a problem since it was not known which member of staff was accessing the server and unauthorized changes were being made to how the server operated. Since P5 was one of the administrators, she was familiar with the infrastructural challenges in the school and the processes for dealing with the challenges. To prevent the unauthorized changes, P5 relocated the server to a more secure location.

> *. . . the electricity goes off so often (emphasis). When it goes off someone has to reboot the internet because it does not come on automatically. We have server and router locked in a media cupboard so everyone does not have access to touching, relocating or reconfiguring (P5, 2:8).*

The power outage together with staff members handling the server, impacted on the functionality of EMIS and placed demands on P5's leadership activity. Thus, P5 improved the security of the server and adjusted the working patterns of staff members accessing the server. Although P5 was aware of the school's electrical problems and the school's approach to dealing with them, her efforts to persevere through the infrastructural challenges to keep EMIS operating were not enough to prevent the inevitable, a system crash. When P5 became

the principal, she entered into the position with the challenge of leading EMIS that had previously failed.

> *You[35] had information on how EMIS was before. Last year the system crashed. I don't know what happened but we could not use EMIS so we had to resort back in June to manually writing the report cards. This year when I took office I knew that this was one of the first major challenges I had to deal with. Thank God Project Team A said that there was an online programme for EMIS, of course the school had to pay and we paid the [$$$$] to get the online EMIS established (P5, 2:41).*

The crashing server was a major conflict since it prevented the school from having any access to EMIS. Providing leadership to move the school beyond this conflict required a collaborative effort from the staff members, the project team, EMIS vendor and the MIS department. Since the school staff members were unable to access EMIS, P5 negotiated with the project team and MIS to resolve the issue. Through negotiating with these stakeholders P5 decided to implement a web-based version of EMIS. For P5, getting EMIS operational was a priority since it was a way she could prove her ability to lead the school through a major conflict. Although the process involved high levels of uncertainty and contentions, it reflected her ability to manage the expectations of senior management for EMIS.P5's positive attitude dealing with the crashed server brings to question Prokopiadou's (2012) arguments of the insecurity leaders feel when facing technical challenges.

The installation of the web version of EMIS moved the school past challenges with the server but introduced a new challenge associated with the school's staff size and internet capacity. After moving the school to the web-based EMIS the internet bandwidth was not sufficient for

[35] Here the principal make reference to the researcher.

the number of teachers accessing the technology. This led to negotiations with the local cable company and the school receiving an increase in bandwidth (P5, 1:42).

Despite having to deal with several infrastructural challenges, P5 did not consider EMIS hindered her leadership of the school.

> *I would not say it hindered me. I would say that there is more potential for the use of EMIS but not hindered. No, I can't say that. I can't think of any one area it has actually hindered. Even with the inputting of the data from the teachers, it is done in a way that does not offset any classes or anything like that. No not hindered (P5, 4:31).*

P5's understanding of EMIS seems to indicate that the challenges associated with the technology are commonly accepted and associated with the role of the leader. Solving the server crash involved moving the school from the Windows-based version of EMIS to the web-based version. P5 acknowledged that the transition imposed on the school's budget, time and administrative focus. However, little consideration is to be given to the fact that if EMIS had not existed the school's resources could have been used elsewhere.

For P5, leading the implementation of EMIS involved addressing challenges associated with how the school performed with the technology. Whilst P5 experienced challenges with EMIS, her role as principal is found to be connected with how the challenges are managed. Since implementing EMIS was a communal effort, P5's leadership involved coordinating staff members towards accomplishing the goal of successfully using the technology. For P5, this involved getting teachers to complete the insertion of students' grades into EMIS in a timely manner.

> *. . . the majority comply but you always have one or two who don't comply and they always are the ones at the last minute, (ahhhh) . . . Those are the ones we have to run*

> *behind to say you did not put in this you did not put in that (P5, 3:20).*

P5's seems to support the arguments of researchers that high levels of coordination are needed for EMIS. Whilst researchers recognise the coordination of EMIS at district offices (Cassidy, 2005; Shah, 2009) and the focus of coordination toward technological infrastructure (Chitolie-Joseph, 2011), P5's understanding reveals a need to focus on coordination at the school level where the work efforts of staff members are aligned to support EMIS. From this view, leadership is necessary to coordinate the work practices of teachers to support the successful implementation of the technology at the school level. Although P5 acknowledged that most teachers complete their recording of student data on time, she expresses frustration at having to deal with those who do not meet the deadline. These teachers cause additional problems for P5, one of which involves having to track down the non-compliant teachers and ensure that they complete their work.

Team leadership and EMIS

P5's leadership with EMIS was supported through the use of teams. She relied extensively on a group of individuals that she, along with other administrators, organized to facilitate the implementation of the technology.

> *We have a team of EMIS teachers; we call them EMIS Team (emphasis), who we have organized this year. There are about eight of them, some of whom were already a part of those working with the system and they have a lot of experience. Ms. [Teacher] being the organizer and supervisor, EMIS Team put information into the system. For example, the incoming grade 7's have to be inserted into the system, so the team would assist administration in putting that information into EMIS program. They would put in the classes, so all the classes that a teacher teaches would be under their name (P5, 2:27).*

Whilst researchers tend to reflect a more supervisory view of EMIS (Chitolie-Joseph, 2011), P5's understanding indicates a communal view where a team effort was essential for training and performing the yearly administrative set up. P5's understanding supports the argument for school leaders to build teams to support achieving their goals and promoting communal efforts (Burke et al., 2011; Northouse, 2007). Her understanding also supports the argument of Wako (2003) for forming situations where knowledge of EMIS could be shared among staff members as they work together to meet EMIS goals.

Although P5's understanding did not indicate any formal means of assessing the effort of the team as suggested by Hauge et al. (2014), the team was assessed based on how the school staff used EMIS (e.g. administrative setup) and how challenges encountered by staff members were addressed. As P5 recognised the impact of implementing EMIS on the organizational role of team members, she expressed a need to adjust their roles to accommodate continued leadership with the technology.

> *Now I know that EMIS Teacher as the overall person for EMIS maybe it has kept her back because people look to her to help with any errors they find or any difficulty they have or anything that seems to be clashing. . . So that means we need to look at it that if EMIS Teacher is going to be EMIS resource person, then maybe we need to cut back a little on some of the work she has to do (P5, 4:35).*

The recognition of the adjustments needed to the team member's work load can be regarded as her monitoring the coherence of the group when work load increases (Burke et al., 2011).

5.5.2 P5's understandings of EMIS contributions

When reflecting on the contributions of EMIS, P5 noted how the technology was useful for accessing student data and teachers' records.

> *I can look at a glance. I can see at a glance. I can pull up a teacher's class instead of flipping through the teachers books. One time ago we used to look at the teacher's mark book but now instead of taking the mark book home you can actually pull up and see what is happening in each of the teacher's classes. You can see how the children are performing (P5, 3:28).*

P5's understanding of EMIS contributions seems to be associated with the convenience of not having to work with manual records. In The Bahamas education system principals are required to supervise teachers' work and school record keeping practices (see section 2.4.2). Since schools continue to distribute and periodically monitor manual records, P5's comments reveal that using EMIS affords administrators a convenient way of monitoring teachers' work. Traditionally principals had to collect teachers' records at predetermined times to ensure that work was being conducted in accordance with DoE policy. EMIS enabled P5 to bypass the predetermined time and the collection of books, and, in doing so, eliminated the input of teachers when accessing their records. With the information received while accessing teachers' records in EMIS, principals are able to respond to what is done. This means that principals are able to monitor work that is done but also monitor work as it is done. This point is also noted in an example she provides of how she would like to use the technology.

> *If I can pull that up from EMIS system at a glance then I can see what is going on and I can see whether we need, as administrators, to do something with this department or what we need to do with a particular teacher or whatever (P5, 4:23).*

This is also noted with the management of the instructional programme and students' academic performance.

> *If we start [inserting student grades into EMIS] by September then by October they should at least have three or four pieces of work in, so we would be able to touch*

> *base with them [low performers]. If we see a lot of children are getting F, F, F we can touch base with that early. Maybe we need a parent conference. Maybe we need some intervention strategy. Maybe we need counselling. The administrator will be able to see what is happening and touch base with it (P5, 3:44).*

Although P5's responses do not speak specifically of her current use of EMIS it reveals her understanding of how EMIS could be used to impact the instructional programme of the school and the management of students.

5.6 Overview of P6's leadership

P6 is a principal of a primary school with 1 vice-principal, 2 senior mistress and 16 teachers. The school's enrolment for 2010 consisted of 879 students (DoE, 2011a). She has been in the education system for 37 years; 7 of which she spent in an administrative position. During the time of this study she was in her second year as principal in her current school (P6, 1:4).

P6 has a sense of duty: this is evident by her active involvement in her local church and by the role focused points of interest she outlines in her principal's report. An example of her sense of duty is reflected in a reminder given to administrators that the '*staff is watching and we need to set good examples*'. Her report provides a brief outline of the general role and specific supervision for herself, vice-principal and senior mistresses (P6, 12; 13R). P6 has a student focused view of schooling and believes the purpose of schooling is:

> *. . . to develop students academically, physically, social, culturally, and spiritually, thus equipping them for a productive life in society and enabling them to function effectively in the wider community (P6, 2R).*

Her vision for the school is to provide the students with '*quality education and environment that is safe, stimulating and favourable to positive learning outcomes'* (P6, 2R). This vision

seems to be rooted in her religious beliefs where a devotion to God involves value for community, culture and social interactions. Although researchers' view spiritual leadership as being associated with dedication and commitment to work (Fry, 2003; Howarth, 2011), P6's spiritual leadership seems to be associated with her commitment to religious beliefs. The prayer she outlines in her report is seen as thanks giving to God for spirituality, environment, culture, community and social.

> *Dear Father God in Heaven, in this our morning prayer, we give Thee thanks our Father for all Thy love and care, for homes and friends we thank thee, for music, birds and flowers, for climate, health and sunshine, for summer sun and showers. Help us to grow gently, more patiently, brave and true. And may we try to please Thee, in all we say and do. Bless all thy children, father, wherever they may be in beautiful Bahamas or far across the sea. Amen (P6, 2R).*

When reflecting on her most memorable contribution in the education system, P6 recalls working with a group of students that other educators were not willing to teach and support academically.

> *To some people it may not be that important but I have an extra group of children who I taught in the afternoons for about half hour and these children were non-readers. . . I took those children that nobody wanted, you know there are always a group of children that nobody wants to take. . . I had four of them who I had to get behind to get them to come and they would not come. But to see the look on that young boy's face, his self-esteem was so high. That, that made me feel so good and I will always remember that. This happened this year and I am already geared that wherever I go, whatever I do I am going to deal with those non-readers. It saddens me to see any child leaving school and not able to read. . . For the rest of my time in education, I am going to work with the non-readers (P6, 1:11).*

P6's strong sense of duty is also noted by the commitment she has for the students in her school and the ability to dedicate herself to their academic needs. From her view, when other

educators opt for the more favourable students she insists on nurturing the less favourable students in her school.

P6 was skilful in securing corporate sponsors to assist the school with supplies such as some laptops for teachers, trophies for award ceremonies, student trips, playground benches and monetary contributions (P6, 17). Both of her senior mistresses assist with EMIS, although their primary roles are associated with class attendance and class registers (P6, 14R). The message throughout the interview with P6 is duty, role and responsibility. Her strong sense of commitment to her students demonstrates her as a committed spiritual leader to the academic needs of her school.

5.6.1 P6 and the implementation of EMIS

Importance of a reliable infrastructure for EMIS

P6 had been a principal at her current school for two years. She shows a positive view of EMIS as she reflects on her experiences working as a teacher.

> *Coming from the classroom, all those years, and looking at what we use to do then and the difference now, it is definitely a plus. Technology in general is a plus. To go from those report books to putting in the data and being able to go back and pull it up is a plus (P6, 1:29).*

P6's view of EMIS seems to be more associated with her beliefs about the potential benefits of the technology rather than her leadership experience. She had four administrators, three of which assisted with EMIS.

> *Ms [senior mistress - A] does the training along with Ms [senior assistant] and Ms [senior mistress - B]. These three persons, if anything goes wrong Ms. Senior Mistress A*

> *would be the one to get in contact with. Failing that we would get in contact with Ms [project team member - A] or someone from the project team (P6, 1:37).*

Although these administrators had leadership responsibility with EMIS, their leadership appeared to be that of a problem solving approach. This approach seems to position the focus of EMIS on challenges, and thus, limits P6's view of the leadership required to implement the technology. In this sense, P6 fails to consider that EMIS significantly undermines her efforts to provide effective leadership in her school. For example, as EMIS was implemented in P6's school she experienced several challenges, one of which was associated with an inadequate number of computers.

> *We have to have computers in order to deal with EMIS, because teachers have to access the computers to use the system (P6, 2:35).*

Although P6's statements may appear to be obvious, they reflect how her understanding of the everyday leadership of EMIS is concealed by the challenges experienced with the technology. Her understanding of EMIS seems to accept the lack of readily available computers without due consideration being given as to how this would impact her leadership. She describes a situation where the network went down and her effort to find technical assistance.

> *I remember the last time we had a situation. Oh my gosh, we tried so hard! We called Education, we called everybody and then I recalled when we first got the programme in the gentleman that we got the computers from was able to do a little something. So I called him and he was able to come in on a Saturday. Thank God he got it up (P6, 1:40).*

Although the principal attempted to contact the DoE persons responsible for supporting EMIS (e.g. project team, MIS), the solution came through a stakeholder not employed by the

DoE (P6, 2:29). This finding seems to support the arguments of Edwards (2005) with regards to the need to work with others in order to receive resources needed to support work efforts. Whilst Edwards (2005) recognizes the need to align actions with others in order to respond to practices, P6 indicates the complexity associated with working with individuals when responding to practices.

When reflecting on P6's personal use of EMIS, she notes how the technology is used to ensure teachers adhere to a standard of performance by monitoring their work.

> *I have to see . . . if they are putting grades in when they are supposed to. We do not always ask them to insert grades at the end of the term. Sometimes we tell them put it in at a certain time and we have to check to see if they put it in (P6, 3:13).*

For P6, monitoring teachers provides a way to confirm that the teachers are doing their work in EMIS at the appropriate time. Her leadership approach seems to be associated with the bureaucracy of the education system where implementing EMIS follows the hierarchical structure of the DoE (see section 2.3.2), without due consideration to the flexible leadership needed for success with the technology.

5.6.2 P6's understandings of EMIS contributions

When reflecting on the contributions of EMIS to the school, P6 compared the process of managing student records before and after the technology. She noted how EMIS was used to provide quick access to student records.

> *For instance, in the past if the student register was not in the office and the teacher had the register, which was the norm. We would have to go to the class because we are not*

> *going to remember every child in the school. Now it is right there on the system, pull it up there it is (P6, 3:4).*

EMIS also contributed by reducing class disruption.

> *So the system is very helpful in that way. We do not have to disturb the class. We do not have to disturb anybody. We get the information and deal with the situation at the office level and that is it (P6, 3:1).*

P6's response reflects the traditional approach to accessing student records before EMIS. The traditional approach interrupted teaching lessons in order to access student data kept in the class register. Since teachers were the primary collectors of school data, information on students was usually collected in the teachers' classrooms. Accessing student data required going into the classrooms to collect the register. This posed a problem, particularly since teachers' instructional practices were interrupted by administrators wanting access to student records. Going to teachers' classrooms also posed a problem for administrators because classrooms are scattered over the school compound. Walking to the classrooms was time consuming. Thus, EMIS provided the data and eliminated the search for the school register. In addition, P6 noted how quick and convenient access to student data facilitated her decision making 'at the office level'.

P6 noted that EMIS assists in compiling students' transcripts.

> *A school might call for a transcript on a child we can pull up the system and see the grades the child has gotten at the time and we can complete the transcript from there. We do not have to go and get all those books and try to get it done (P6, 3:15).*

By using EMIS to assist with transcripts and not automatically generating one, P6 seems to overlook the capacity of the technology to produce the transcript. Overlooking the feature of

EMIS seemed to be associated with a lack of acceptance of the transcript produced by the technology. Although she was aware of EMIS capacity to produce a transcript, she still relied on the traditional process of compiling the transcript. P6's understanding indicates that although EMIS did not produce a completed student transcript it contributed to the process by its calculation of student grades. Producing a completed transcript in EMIS requires modifications to the software. This finding seems similar to the arguments for software modification to facilitate the implementation of EMIS (Cassidy, 2005; Matemba, 2011).

P6's interest in the future development of EMIS in her school focused on teacher's access to the technology.

> *It would be a good idea for every school to have the web-based EMIS so that teachers could put their grades in at will. I know that some of them at times have a lot of things to deal with, being free to do that they may not feel so frustrated when it comes to putting their grades in (P6, 3:36).*

P6's focus on teacher access reflects concern for the challenges her teachers deal with when using the technology, and the challenges leading her staff through the process. Viewed in this light, a more convenient experience for her teachers with EMIS facilitates a more convenient leadership experience for her in the process.

5.7 Summary

This chapter has summarized findings with regards to each principal's understandings of EMIS in their school. Analysing EMIS in relation to principals' understandings allows better explanation of the ways in which the technology is embedded in leadership. This analysis explains a leadership perspective of EMIS by drawing on understandings with the technology. Principals were able to make use of EMIS despite the challenges associated with the

implementation. Whilst implementing EMIS involved addressing challenges, each principal maintained their commitment to EMIS and was able to acknowledge some contribution of the technology.

CHAPTER 6: CROSS CASE ANALYSIS OF PRINCIPALS' UNDERSTANDING OF IMPLEMENTING EMIS

This chapter presents cross case findings of the embedded cases on EMIS. The chapter begins by highlighting principals' understanding of the primary uses of EMIS. It then explains principals' understanding of the impact of EMIS on their role as leader. Finally it summarizes the discussion.

6.1 Primary uses of EMIS: cross case analysis

The role of principals involves serving the education system through supporting the policy decisions of policy makers rather than working on their own (Hallinger and Lee, 2014). Senior management initiated EMIS that has important implications for principals' understanding of EMIS and how they provide leadership with technology in the school. The 'top-down' directive to implement EMIS carried expectations that influenced how EMIS was used in reality.

When asked about the uses of EMIS, principals indicated multiple uses. However the primary uses included generating the school's end of term report cards, facilitating school management, and mechanisms for monitoring. These are discussed below.

Generating the end of term report cards

The findings reveal that principals perceive the most frequent use of EMIS is to generate the school's end of term report cards. All six principals indicate this use. For example P5 stated '"*all EMIS is being used for is to generate report cards*"' (P5, 1:27); P2 stated '"*the focus is just on the creation of the report card*"' (P2, 4:21); and P6 stated '"*other than using EMIS for*

report cards we do not use it for anything else"' (P6, 1:39). The findings with regard to using EMIS to generate the end of term report cards are grouped into two areas: improving the end of term report card process and generating the report card.

The end of term report card process prior to EMIS

Generating the report card requires the collaborative efforts of all teachers and administrative staff (discussed in section 2.4.2). P1 explains her experiences of this earlier process as labour intensive.

> *Before EMIS came on stream, we had to laboriously write on every report card, finish them in a particular time and send them around to all of the administrators to sign (P1, 1:40).*

Although the DoE calendar allotted 'working days' (see section 2.4.2) for the reports to be prepared, these days were usually used by teachers for marking students' assessments. This is due to the fact that some teachers use this time to mark students' assessments that were given throughout the term (P3, 4:3). With the large amount of assessments reserved to be marked at the end of the term and the fixed amount of time for preparing the reports, it is no surprise that during this process errors occurred. P4 states:

> *With the mark book teachers had to put in the class grade, the exam grade and then calculate the final grade. . . Yes during this process, sometimes teachers make mistakes and the administrator has to go back and revisit what was done (P4, 4:20).*

Errors happened and were not only seen in the calculation of grades, but also found in the correct name and age for students. P1 states:

> *Students come from the primary school with the name [Jon][36] in September and by December that same child wants to get a report card with the name [Jonathan][37]. The name spelling has been changed, the age sometimes has been changed. We know that three months after September, in December we have to generate a report card which must have all the correct records of this child. So when they come in September we put them on EMIS (P1, 4:15).*

Prior to EMIS, the process for generating student report cards was perceived by the principals as being tedious and time consuming, and at times prone to errors. Efforts had to be taken to ensure errors were eliminated. This meant checking the spelling of student names and grade calculations placed on the report cards, and keeping staff aware of the timing for submitting completed end of term tasks.

Contributions of EMIS on the report card process

The Bahamian education system is noted for its focus on student examinations (see section 2.6), and generating the report card is a practice that focuses on students' examination scores (see section 2.4.2). When EMIS was introduced into the school the principals perceived that the practices associated with generating the report cards had a large impact in terms of the ease and time saving in completing this task. Appendix-J contains a copy of an end of term report card produced with EMIS. This change noted by the principals can be summed up in the words of P1:

> *EMIS was a new innovative method of compiling student records and preparing them for report card day (P1, 1:37).*

[36] Words in parenthesis are added by researcher to maintain confidentiality.
[37] Words in parenthesis are added by researcher to maintain confidentiality.

P1 reflects the fact that EMIS brought a sense of innovation to the report card process. The principals perceived that the speed and accuracy of the technology enabled the school to have control over the report card process. This improvement was welcomed by the principals. Such fascination and control over routine work is a general expectation associated with technology used for organizational work (Leidner and Tarvenpaa, 1995). When comparing the report card process before and after EMIS, P4 reflected on teacher calculations. She noted that by using EMIS to generate report cards the process of calculating the term grades, final grades and GPA was much easier. She explains:

> *. . . the difference that makes it easier for persons using EMIS. Teachers just put in the grades and EMIS will do all the calculations, all of the summary and all the GPA (P4, 4:21).*

By performing the calculations, EMIS reduced the work required of teachers and the principals providing leadership of the report card process. In performing all the grade calculations, EMIS not only made calculating grades easier, it was believed to produce more accurate calculations. Reflecting on her experience P1 states:

> *We did not have to rely on the teachers calculating the scores. There was more accuracy. Human error was lessened because once we put the grades in EMIS, the programme would generate the report card, calculate the grades and come up with the final results that would be put on the report card (P1, 1:49).*

In addition to EMIS performing grade calculations, principals also commented on how the time taken for the administrative preparation of the report card was reduced. Reflecting on how the homeroom teachers had to write student's name, age and demographics on the report card, P4 states:

> *But now EMIS Secretary puts the whole school in the system. She has everyone on so she would be able to go in to [set up][38] the teacher's class (P4, 5:2).*

With EMIS, the homeroom teachers no longer needed to write student demographics to set up the report cards. This information was set up by a member of the administrative staff or staff members selected by the principal.

In addition to reducing the amount of writing on the report cards, EMIS was perceived by the principals to reduce the time required to prepare the report cards. This was because they were simply the same document repeated again and again, and technology can complete such tasks much more easily and faster than traditional labour intensive methods.

> *So basically, it was about seven to ten working days that teachers had to have at the end of term before they could produce the report cards. When EMIS came along, EMIS was able to produce these report cards in less than half the time because we only needed to give the teachers one or two working days to prepare their mark books electronically (P1, 1:41).*

Although the contribution EMIS brought to the report card process was desirable, the technology was underutilized. Some features of EMIS were needed but were scarcely used, such as student attendance and transcripts. P2 recognised the unsatisfactory level at which the technology is used.

> *The only thing that is being used on EMIS is posting grades by teachers, creating the report card . . . but what about the other features that are being paid for? They are not being used (P2, 2:35, 33).*

[38] Parenthesis added by the researcher to give clarity to the statements of the respondent.

Principals indicated that the primary use of EMIS was to generate the school's end of term report cards. Using EMIS to produce report cards challenged principals' leadership of the report card process. Incidences where EMIS conflicted with the completion of the report cards were immediately addressed. For example, P5's experience of reprinting reports that had incorrect GPAs. The automation of calculations and reduction in errors stood out as key benefits of using the technology.

There are several reasons for the limited use of EMIS features, e.g. in the use of lesson preparation, scheduling and timetabling. The first is associated with the relevance of EMIS features to the leadership and management. Several features of EMIS are not applicable to the practices of the school, e.g. bus scheduling, and lunch menu listing. Thus, they were not used. Another reason for the limited use of EMIS was related to the restrictions the technology places on the format of reports as it restricts the display and print format of the reports. The culture of The Bahamas placed emphasis on reports produced by schools, particularly the report card day (see discussion in section 2.4.2). The school leaders ensured that the reports given to the public are acceptable in format, accurate and on time. Since different output formats are required by different stakeholders, the inability of EMIS to produce the desired format restricted its use. Researchers note that improving the functionality of technology to fit the local culture increases the level of usage (Zhang, 2013; White, 2013). Thus, increasing the output format of reports to align with the needs of stakeholders in the school increases the desirability of use.

Another reason for the limited use of features is associated with the education policy. In general, principals work within the confines of policy; since there is no policy for the level of implementation for EMIS, principals have little motivation to use the technology's features. Another reason for the limited use of EMIS features is due to the fact that implementing

EMIS in the school requires changes to the data handling process of the education system. However, the existing practices and processes are so engrained that the need for change at the national level to facilitate change at the school level is not clearly recognised. It seems as though the question of how this sort of change is to be implemented was not considered initially.

Facilitating school management

A cross case analysis of principals' understanding with EMIS indicated that the technology facilitated the management of the school. The responses from all six principals indicate that EMIS was used to facilitate school management, either by assisting with the management of school records or by assisting administrators in the planning, decision-making and reporting processes.

Implementing EMIS into the school was considered a way of modernizing management practices. P1 summarizes this view.

> *I would say EMIS has been an electronic management system. We have a management system, but, because we now live in the age of information, written data can now be translated into electronic data and we can store more information because of EMIS (P1, 5:11).*

P1 reflects how implementing EMIS was considered a modern approach to management that afforded administrators electronic management of schools. Pointing out the fact that a system of management was in place prior to the adoption of EMIS, P1 brings focus to the particular aspect of management that EMIS provides, that is school data management. Managing school data supports the management of the school since it is seen to provide more reliable information for management activities, such as planning and decision making.

As will be shown below, the findings reveal that managing the school records with EMIS facilitates a form of leadership that monitors staff in their work. In this sense, leading EMIS in the school serves as a means of ensuring that the school staff conforms to the organizational structures of the education system.

Managing school records

There are several types of records that exist in schools, i.e. attendance register, lesson plan books and confidential records (see section 2.2.4). School records are managed to provide evidence of the students' performance and to identify procedures established by management. Principals identified various ways in which EMIS facilitated managing school records.

P1 noted how EMIS facilitated the management of school records by improving the accuracy of data recording. She states,

> *The data could have been invalid because of the human element. But when you use the electronic means you make it more reliable, valid and objective (P1, 5:17)*

For P1, using EMIS facilitates the management of student data by enabling more accurate recording of student assessment scores. According to him, more accurate reporting of assessment scores increases the validity of information that is used in the decision making process, and thus, improves the management of school.

Accurate recording of data had been an issue with the DoE, thus a monitoring and reporting mechanism was developed across all levels of management in education to provide information on the reporting procedures and to guide standard practice (MoE, 2009). At the school level, most of the data (e.g. student attendance, grades, discipline, subject classes and internal/external exam results) is collected by teachers. Principals indicate that recording of

student final term grades, in some instances, had been subjected to teachers' discretion instead of students' actual scores on assessments. P1 notes how EMIS was used to manage school records by reducing opportunities for subjective recording of students' scores (P1, 4:41). For P1 the subjective recording of students' scores gives a false reflection on the learning practices of the school, thus, the report can no longer be relied on to provide information on student learning. P1's comments show the effect that using EMIS for reporting information can have on the administrative practices of the school.

Reflecting on the difference between the manual record keeping system and that of EMIS, P4 noted how EMIS was used to manage school records by improving the access and confidentiality of students' files.

> *With the manual report the clerical staff had access. If I needed one of the staff members to sort out a class they are able to touch a lot of persons' file. So it is more confidential with EMIS (P4, 5:13).*

Using EMIS to reduce the number of staff members handling student records restricted the level of access staff members had with student records and improved confidentiality. In this sense, confidentiality of student files is associated with managing school records. P4 also noted how EMIS was used to manage school records by enabling information to be generated quickly (P4, 3:27). Preparing the 'principal's report'[39] requires compiling statistics on school performance. For P4, EMIS enables this report to be managed by generating data quickly. Thus, as information for the principal's report is easily generated, school records are managed more efficiently.

[39] 'Principal's report' is the document the DoE requires principals to prepare at the end of the school year and summarizes activities occurring in the school throughout the year. It also identifies the school's goals and outlines how the goals were achieved. Included in this report is the average GPA for the school as a whole. Principals spend hours preparing charts and graphs to present the information the DoE requires in these reports.

Challenges using EMIS to manage school records

Although some principals had positive experiences of using EMIS to facilitate the management of school records, other principals had challenges. P3 explained the challenge of updating EMIS when she took a new leadership post.

> *When I came in, the former principal had just gotten the system and no corrections had been done to situations. So I was busy last year trying to upgrade information that should have been there the summer before. So that was a challenge (P3, 2:21).*

This statement reflects the frustration felt by principals that implementing EMIS is time consuming and depends heavily on human efforts to setup and maintain. The comments also express the feeling of intense pressure experienced by principals as a result of the burden of administrative duties and the end of term reporting processes. The school records constitute the main means of documenting and accessing data about school work and thus impact the evidence of effective school leadership. In order to setup EMIS P2 relied on the support of the project team. This initiated additional challenges that made managing EMIS even more cumbersome. She explains her disappointment at not being able to use EMIS to manage other school records.

> *You're supposed to be able to go to the programme (EMIS) put in the person's name, say what you want done and it presents you with a record but that's not happening (P2, 4:1).*

From P2's understanding it is noted that using EMIS to produce school documents, in addition to the report card, does not currently happen. Other principals also expressed concern about EMIS not being used to produce other school documents. P3 extended this

concern by questioning if, when and how EMIS would be used to include national exams (P3, 4:14).

Using EMIS to produce school records presents a complex task for principals, particularly since they are ingrained in the process and practices of both the school and the DoE. The dependence of electronic records on the technical infrastructure heightens this complexity. Responses of principals indicate the challenges of using EMIS to manage school records. These challenges were associated with updating information in the database and with the inability to use EMIS to manage other school records. The importance of handling records for its contribution to school management is crucial.

Managing the school using data from EMIS

Principals frequently use data to drive decisions as they manage the school. This section presents findings on how principals use data generated in EMIS to manage the school. The responses from three of the six principals indicated that the data produced by EMIS assisted administrators in the planning, resource allocation, decision-making and reporting processes.

In the school there are many forms of data such as attendance, grades, demographics and discipline. In addition, there are many techniques for collecting data such as registration form, transcript request forms, mark books, attendance registers and sign in sheets. P1 states how data from EMIS assisted administrators in the management of resources.

> *The data drives our resources and it drives the personnel decisions. We have to have staff and we have to have the resources to accommodate what we plan to have done (P1, 2:22).*

For P1, EMIS assisted in the coordination of resources and staff. Throughout the term principals communicate with the DoE on staffing requirements for the school. This is done to

ensure that principals have sufficient subject teachers, administrators and support staff to manage the school. P1 uses data from EMIS to determine how many subject classes and teachers are needed. Thus, by accessing data from EMIS she is better able to coordinate her resource and staff requirements.

P3 states how data from EMIS facilitated strategic management of the school. She states,

> *From that [the data][40] I should be able to strategize on what I need to do in this area to upgrade. That's the way I see it (P3, 3:15).*

For her, strategy involves a plan to achieve her goals as principal. Thus, data from EMIS has a primary role in helping her sort through the possible options and recognise which decisions she needs to make. She believes using data produced by EMIS enables her to achieve her objectives, allocate resources and set goals.

External stakeholders frequently call the school to obtain information on students. This includes principals' response to enquiries made on school matters. P1 notes how EMIS is used to quickly retrieve school records to verify information on a student who has graduated. She states:

> *You have to go back to your junior high school and primary school and get a letter from the school. So when the student comes we take the name and go into our data bank and look at the student data information and use this information to verify with a national agency such as the immigration. Or if a student is going to get a job at one of the hotels over Paradise Island they would come back to the school for a record of the academic and social performance that they did during their school time (P1, 4:28).*

[40] Parenthesis added by the researcher to bring clarity to the respondents' statements.

The responses of principals indicate that data from EMIS assists in the management of resources by providing the data needed for the coordination of classes and teachers. Responses also indicate that data from EMIS facilitates school management by providing information that assists principals in decision making. Thus, instructional time is not interrupted and the administrator saves time when accessing student records. These findings support the arguments that EMIS can assist schools with collecting data, documenting activities and disseminating data (Salaman et al., 2002; Chitolie-Joseph, 2011; Bhatti and Adnan, 2013).

The cross case findings of principals' understanding of EMIS revealed that the technology was underutilized. For example, the student demographic data that was entered into EMIS was scarcely used. This information was entered into the technology at the beginning of the school year during the registration process but seldom updated during the school year. The common use of the student demographic information was to retrieve information on students' name and address, parents' name and telephone number, and class lists for students and teachers. The addresses and telephone numbers were often used to call students' parents/guardians for meetings. Class lists assisted principals in locating students when needed and to verify class enrolments.

Based on the principals' responses there is a need for other components of EMIS to be used. For example, student attendance records are still being recorded manually (see Appendix - D); administrators still resort to the Master Timetable poster to find teachers and student schedules (see Appendix - E); financial and teacher demographic components of EMIS are not used as yet.

Whilst principals did not utilize all of the features in EMIS, they still resorted to the data stored in the technology for school management processes. The automated functionality of EMIS contributed to a reduced workload by providing quick access to student data. Simple benefits such as organizing students' names, birthdays, addresses, homerooms, subject classes, and being able to quickly retrieve this data were found to facilitate management decision making. Principals seem to use the data produced by EMIS that was more tailored to the daily processes of the school since it supported their administrative activities. None of the principals made reference to the financial feature of EMIS, which is perhaps due to the fact that this feature was not used.

Monitoring mechanism

The cross case analysis revealed that principals used EMIS as a monitoring mechanism. The responses from all six principals indicated that EMIS was used by administrators to monitor teachers and/or by parents to monitor the performance of their child.

Monitoring teachers

The school calendar requires that national report cards be ready for distribution on a pre-determined date (DoE calendar, 2011b). One of the supervisory responsibilities of principals involves assigning and monitoring work on a day-to-day basis to ensure that standards and deadlines are met (Jobchart system, 2007). Traditionally, monitoring involved collecting school records (teachers' lesson plans, mark books, forecast books and student registers) and going through them to ensure that these records are up-to-date. EMIS provides a more convenient way of conducting this task since it requires teachers to insert data from their mark books into the technology. Principals indicate that EMIS is used as a way of performing

their duty and as a monitoring mechanism to ensure that teachers adhere to the desired standard of performance.

P1 states that her purpose for participating in the initial EMIS training was to monitor what was being done with EMIS. She states,

> *I went along even though I know that I was not going to be directly dealing with it. I got a password. I got administrative privileges and I went into EMIS to see what was being done with EMIS (P1, 2:29).*

P1's response of 'going along' reflects her intention with EMIS. It appears as though her intention for getting involved with EMIS training was to be aware of what her staff members were doing with the technology. She portrays her involvement with EMIS as one of overseeing staff.

In order to insert students' grades into EMIS teachers need to teach students, assign work to students, assess students in their work and record the assessment score. As work is conducted in EMIS principals are able to access the specific date and time of work submitted. Thus, agency is inscribed in work tasks, and by monitoring teachers' insertion of students' grades principals indirectly influence the school's instructional practices and the teachers in that practice.

P4 also commented on the importance of timing when using EMIS to monitor teachers' work. She states:

> *We give teachers deadlines, for example we can say by this date we want to see a certain amount of grades in. We can go in, view and check behind their backs. We don't have to ask the teacher did you put in your grades. We can go and see for sure and then we can make our own documentation*

> *to say you were late here or you did not do this or you did not do that. So it helps in that way as well (P4, 3:30).*

P4's response indicates how helpful EMIS is in allowing teachers' insertion of students' grades to be monitored covertly. For her, monitoring is used as a way of ensuring compliance with the timely submission of work. Although P4's activity matches with the record keeping responsibilities outlined by DoE teachers (DoE, 2004), her '*behind their back*' approach is at odds with researchers who suggest that the more connected and collaborative principals are with teachers the more supportive the school climate becomes towards the use of technology (Moolenaar et al., 2010; Burke et al., 2011). This means that principals should focus less on the technology and more on building relations with the staff in order to facilitate a climate conducive for technology.

However, several reasons exist for P4's covert monitoring. The first being that EMIS is used to conduct school practices that are directly associated with the academic calendar of the school (see section 2.4.2). Thus, the work of all persons involved has to be conducted according to schedule, and principals need to ensure that staff completes their work in a timely to the appropriate standard.

Monitoring teachers' work with EMIS is a privilege that also involves the schools' administrative staff. P1 explains how administrative staff used EMIS to monitor teachers.

> *They can tell us how many teachers have put in information in their mark book, because they watch every day. They come to the program, they can know whether a teacher put in their information yesterday, they can know whether a teacher put in their information wrongly, they can know whether the scores we have in the mark book are different from what is on EMIS. They are monitoring the work that is being put inside (P1, 3:16).*

By monitoring teachers, administrative staff can inform principals with regards to teachers' performance. This includes the number of entries, the timing of entries and the proper mode of entries.

Monitoring as a way of performing duty

The response from principals also indicates that using EMIS to monitor teachers is a way of performing their duty. P6 speaks of how monitoring teachers' work with EMIS is a way of performing her duty.

> *I have to see that the teachers are doing what they are supposed to do (P6, 3:11).*

Her response, '*I have to',* shows the sense of obligation principals have to their supervisory duty. Thus, monitoring is something that she is required to do. The involvement of the administrative staff in the monitoring process is also associated with a sense of duty. P5 states that ensuring teachers meet the performance standard is an important factor for the completion of other administrative duties.

> *Within a certain time frame for EMIS, all of the teacher's grades must be in so that we can do the calculation (P5, 3:12).*

According to P5, using EMIS to monitor teachers' recording of all students' assessment is a prerequisite for administrative tasks. Thus, EMIS facilitates the management of school by providing a way to monitor the timely completion of teachers' work and administrative calculation. These calculations are associated with administrative reports prepared throughout the school academic year.

P3 also noted the challenge of getting teachers to enter their students' grades within the time frame. She explains her strategy:

> *What I normally do if I go into a teacher's grade book and I don't see grades entered, first I speak to you [teacher] and next week I give you [teacher] a letter. No teacher wants to see anything in black and white. That is negative so you have them entering the grades (P3, 4:6).*

As a way of dealing with the non-compliant teacher, P3 calls the teacher in to address the matter, and if the teacher does not show satisfactory improvement a letter of reprimand is issued. This approach she believes acts as a form of discipline and motivation. In addition to giving a letter, another tactic used by P3 is conducting weekly checks. Thus, she logs into EMIS regularly to ensure that teachers are performing their work. She believes that teachers' awareness of her weekly checks motivates those teachers who put off marking student's assessments given throughout the school term, leaving the task for the end of the school term. She describes these teachers as '*lazy*'.

> *The lazy teacher who would have waited to the end of the term to pick up a child's book to say 'I'm collecting all of my grades', know that now every week I'm looking into the system (P3, 4:3).*

Based on principals' responses, it seems that EMIS allows principals to obtain proof of the time and quantity of work. Thus, they are able to lay blame, if necessary, on the teacher for not having conducted certain activities.

The responses of principals reveal that using EMIS as a monitoring mechanism becomes a means of control as opposed to one of support. Since EMIS is based on performance, the technology's design to focus on teachers' insertion of student grades has, in effect, redefined the way principals supervise teachers. As principals gave importance to inputting students'

grades into EMIS, teachers became disciplined when recording their students' grades. The importance given to the insertion of student grades has refocused principals' interactions with teachers from a supervising to a monitoring role. Principals' monitoring of teachers is directly linked to concerns about performing the responsibility of a principal and achieving the aims of the DoE. Monitoring became a means by which the schools' response to organizational change could be audited and controlled, and thus, it was conducted around predefined tasks (i.e. a defined number of students' grades to be inserted into EMIS by a certain date) to assess the performance of teachers at specific times of the school year. Using EMIS to monitor provides a convenient way for the administrators to check that teachers are completing responsibilities on a day-to-day basis.

Accountable parents

In addition to monitoring teachers, principals also indicate how EMIS was used to facilitate parents' accountability. Principals perceived monitoring of this sort to be done by parents to check on the performance of their child. Three of the six principals indicated this response.

P2 recognised how EMIS was intended to be used by parents to monitor their child's academic performance. She states,

> *I see where EMIS has gone ahead. They are trying to make the parent more accountable, in that, they are making it more accessible to parents where they can just look and see the child's grade (P2, 6:23).*

P2 sees this as a way of promoting responsible parenting by providing convenient access to their child's performance. P4 also commented on parents using EMIS to monitor their child's performance. She states:

> *Parents can sit home and see what's happening. They can police the progress of their child and if there is something they are not pleased with they don't have to wait until report card day to hear bad news. It is good that parents can do this (P4, 4:33).*

She sees EMIS as a positive monitoring mechanism that allows parents to observe the progress of their child's academic performance. She also sees how EMIS affords parents the ability to act quickly in response to unacceptable performance.

P3 expressed feelings of how EMIS affects parents' involvement with their child's education by using EMIS to monitor their performance. She states:

> *I feel with time, EMIS programme will cause our parents to realise the importance of becoming actively involved in the life of their children. Rather than wait for PTA or report card day, if you could go on every week and check to see what your child is doing (P3, 6:18).*

P3 recognizes EMIS as a medium facilitating communication between parents and subject teachers. With more involvement, she feels that parents will rely less on PTA meetings and the national report card day to gain awareness of how their child is performing.

This section has looked at principals' understanding of the primary uses of EMIS. It has revealed that EMIS is primarily used to generate report cards, facilitate school management and monitor teachers work. Using EMIS to produce report cards reduced the number of calculations teachers had to make, calculations were more accurate, workload was reduced and time was saved. In addition, EMIS was used to facilitate school management by assisting with the management of school records and providing information for planning and decision-making. Principals also indicated that EMIS was used to monitor teachers in their work process, and by parents or administrators to monitor student academic performance.

6.1.2 Leading EMIS as conflict ridden

As EMIS was implemented into the schools, principals associated the process with conflicts, that is, the challenges, difficulties and concerns associated with introducing the new technology into the workplace. All six principals shared incidences of multiple conflicts. The conflicts are grouped based on functionality of the infrastructure and commitment from senior management.

Functionality of the infrastructure

Functionality refers to the usefulness of the computer hardware, software and networking components for supporting the school's processes and practices. These are required to be set up in the school prior to the installation of EMIS, and are assumed to be operating at a level to accommodate EMIS. The scope of functionality is broad since it involves multiple functions such as the school's printing processes, data storage and retrieval processes, security and access protocols, and administrative processes. Principals' understandings of the implementation of EMIS are found to be associated with functionality conflicts with the computers and networking. Conflicts experienced by principals supports the findings of other researchers with regards to implementing EMIS (Williams et al., 2000; Bisaso et al., 2008; Bhatti and Adnan, 2013; Chitolie-Joseph, 2011; Bass, 2010; Stella, 2011; Chikwa, 2012). Functionality of the infrastructure is addressed below under the following headings: availability of computers and network functionality.

Availability of computers

It could be argued that having computers for EMIS is an obvious necessity and that most schools in The Bahamas have many computers. However, computers in schools tend to be

allocated for students (see section 2.3.2). P5 mentions setting up a new computer lab[41] in the school and confirms that the primary users of the computers are students (P5, 2:21). P4 mentions not having a lab at all (P4, 2:14).

The lack of sufficient computers to be used readily by teachers generated conflict that prevented the school from using EMIS effectively, if at all. This challenged principals' technology leadership and led them to search for a supply of computers. P4 expressed her experience of having to get the computers to use EMIS.

> *We needed corporate sponsors to have the computers and all this other stuff in place. . . Where this school is at now has been through corporate sponsors and our own fund raising efforts (P4, 1:27; 6:10).*

Having computers in the school involved local fund raising activities and reaching out to the corporate world. For P4, implementing EMIS involved frustration and tension due to the lack of available computers.

P1 recognised that meeting the infrastructural needs of the school is associated with the efficient use of EMIS.

> *I think that the Department of Education could put more hardware to facilitate. . . And once we get the hardware we can improve the efficiency of the system (P1, 5:39; 22).*

P1's response indicates that improving the efficiency of EMIS involves having more computers. In this sense, the availability of computers in the local culture becomes the basis upon which the school performs with EMIS. Thus, without the adequate supply of computers

[41] Appendix - B shows examples of computer labs of some of the participants in this study. The labs were used mainly for students' instructional purposes.

a conflict exists that challenges the success of EMIS. These findings support the arguments of researchers who note that infrastructural requirements of the local culture are often overlooked when new technology is implemented from the top (Blignaut et al., 2010; Shields, 2011).

Network functionality

Four of the six principals' associated functionality of the infrastructure with the school's network. All schools in this study started using EMIS on a local Windows based server that was set up and maintained by the MIS department. The server acted as the control point for the network, internet protocol and platform for EMIS.A picture of the server used in one of the schools is found in Appendix-C. Principals associated EMIS with the network and internet. They believed that when access to the internet is not available access to the network and EMIS is not available. Thus, the server was considered to be important and its location became a major point of concern. When EMIS was initially installed it was placed in one of the school's administration offices.

When reflecting on the school's infrastructure, principals acknowledge the importance of having infrastructure in place and functional for EMIS to be installed. However, they had to come up with the resources to sustain the infrastructure to support the continued use of EMIS. The initial underlying assumption principals held with EMIS was that once the technology was installed, it would function according to the DoE's expectations. However, it was realised that the functionality of the infrastructure and the interactions with staff members were just as important. Thus, without a properly functioning infrastructure and stakeholders' support, the implementation of EMIS is arduous. The crashing server incident experienced by P5, and the concerns of P4, provides evidence of this. Thus, implementing EMIS involves

more than merely having the technology. Without the proper supply of computers and maintenance of the network to ensure the functionality of EMIS, the implementation is challenging. These conflicts impact how principals' manage the technology and the school. The principals reveal a lack of infrastructure to support the implementation of EMIS that supports the findings of other researchers (Chapman, 1991; Williams et al., 2000; Bisaso et al., 2008; Bhatti and Adnan, 2010; Chitolie-Joseph, 2011; Bass, 2010; Stella, 2011; Chikwa, 2012).

Commitment of senior management

Senior management indicated that the education system would progress through the use of EMIS (discussed in section 2.3.2). Although institutional policy aspires to school improvement, the operational reality of this is questioned by principals. The findings reveal that principals' understandings of EMIS are associated with senior management's commitment to the technology. Principals' indicated that the commitment from senior management is lacking and this contributes to conflicts when implementing the technology.

The commitment of senior management emerges as principals spoke of the DoE involvement with EMIS. Principals perceived the DoE as the owner of EMIS since it was initiated from the Director's office. However, principals found themselves having responsibility for providing the resources needed to make EMIS operational. An underlying expectation principals held with regards to EMIS was that the DoE initiated the technology, therefore it should provide the resources needed to ensure successful implementation.

The expectations senior management had for EMIS are not the same as the reality of principals. Senior management expectations for EMIS include: enhanced workplace, increased productivity and minimized workload of administrators, and readily accessible

information (see section 2.3.2). Principals had different understanding with the technology, which are sorted under the headings *functionality of the technology conflicts* and *commitments of senior management conflicts*. In addition to the directive to use EMIS, principals' responses gave no indication of clear direction from senior management as to how EMIS would benefit the education system. Thus, principals implemented EMIS to the extent they believed it helped them manage the school.

The conflict perceived by the principals with regards to senior management's commitment to EMIS is supported by a series of headlines in a local newspaper[42] where government officials are accused of misappropriating public funds (P2, 2:38, 1). The lack of commitment from senior management with technological implementation supports the argument of Chapman (1991) that EMIS can result in the misappropriation of public funds. The government developed an initiative for EMIS, acquired funding from the Inter-American Development Bank, purchased the technology from a vendor, and encouraged schools to participate (see section 2.2.3). Although some schools received a server and five computers, some principals did not receive any computers or financial assistance to support the implementation of EMIS.As principals reflect on the commitment of senior management their responses reveal high levels of frustration.

While there are divergent views on the leadership of technology, proponents for EMIS have come up with a view that EMIS should be understood and driven by top management. From their research on the sources of influence on beliefs about information technology, Lewis et al. (2003:669) argues that the commitment of senior management positively influences the perceived usefulness of technology, and that the commitment of senior management shapes

[42] The article refers to the student information system (SIS) which is the same as EMIS. These terms EMIS and SIS are used synonymously (Nicolls, June 2011).

individuals' beliefs with technology. The findings of this study support the argument that senior management commitment is linked to the use of technology. It reveals that a lack of commitment from senior management is associated with principals' negative perceptions of the technology.

The principals indicate that DoE officials were not using EMIS to collect the data needed. Instead, they were calling the schools requesting information that should have been accessed via EMIS. Such was the case with P3 who stated that EMIS should include the statistical data that the DoE frequently requests from the school. Principals were of the view that DoE requests information from the school when they themselves could log into the technology and retrieve the data needed without the school having to retrieve the data. This means that even though schools had EMIS they still had to compile data for the DoE and this added to the principals' frustrations with the technology.

The production of school data was found to be repetitive since it involved producing similar information for different education officials. Principals perceived that the repetition negatively impacted staff morale. Thus, principals had to frequently give encouragement to keep the staff motivated with EMIS.

Throughout the interviews principals were energetic when speaking of how others could or should use EMIS. This same energy was not noted when they spoke of their personal use of the technology. For example, P4 recognised one contribution of EMIS was associated with its feature that enabled parents to remotely view their student's data (P4, 4:32). When speaking about this feature, P4 perked up and became really positive. This attitude was not noted when she spoke of how she used the technology. This finding reveals an 'inward' and an 'outward' way of referring to technology. The 'outward' way regards another as the primary

user of the technology and views benefits that would be useful for those users. The outward tends to have a positive view and result orientation that often overlooks the process and effort associated with achieving the positive view and result. The 'inward' way regards technology based on personal experience and the technology is understood based on those experiences with the process and interactions that tend to become blurred by challenges faced.

6.2 The impact of EMIS on principals' role as leader: cross case analysis

This section presents cross case findings of the impact of EMIS on principals' role as leader. As will be discussed below, the findings revealed that implementing EMIS has disrupted the division of labour in the schools, destabilized the leadership role of principals in the process, and challenged principals' interactions with stakeholders.

The principals gave an overwhelming impression that being a principal is a personal calling and a rewarding experience. They all mentioned positive occurrences with a clear focus on students and they acknowledged having personal spiritual convictions and spiritual devotion to Christian values. Overall, principals seem to show a strong leadership presence that is noted through their devoted sense of concern for students, and their ability to gather support and commitment for their school's goals. They often draw on their spiritual beliefs to inspire themselves and motivate their staff towards a high level of effort.

6.2.1 Impact of implementing EMIS on principals' role as leader

Being a principal comes with leadership and management responsibilities. How principals carry out these responsibilities when implementing EMIS offers insight into the leadership roles with the technology. The cross case findings of principals' leadership with EMIS indicated that the technology challenged their leadership. All of the six principals shared this

view; three principals associated the challenge with a need for more technical knowledge, while the remaining three associated the challenge with a need to increase school performance. In addition, two principals associated the challenge as foreign.

Impact associated with technical knowledge

The findings show that the impact of implementing EMIS imposed upon principals' role as a leader. For example, P4 indicates that her leadership role expanded to accommodate the technology.

> *I'm not [a technology person][43] you know, but it does not mean I should not push it. I push it because I know this is where our children are going; this is where we are leaning. It has nothing to do with me personally, but I still push it. I try my best in whatever assistance I can render to teachers in that area. There is no point in me sitting and being blind to the fact that technology is here and it is here to stay (P4, 1:21).*

As P4 reflects on EMIS, she indicates how her role as principal is challenged to provide support to teachers using the technology. Such support requires her to move beyond being a passive observer to a role that is actively engaged with helping the users in the successful use of the technology. Thus, she seems to take a supportive role to assist her staff in support of the technology. Implied in the statement of not being a '*technology person*' is the lack of experience in knowing how to operate the technology. By moving beyond her view of not being a '*technology person*', P4 reconstructs her leadership to allow staff members with more knowledge about the technology to have a more influential role in deciding how EMIS is

[43] Parenthesis is added to bring clarity to the response of the participant.

implemented in the school. In this regard, implementing EMIS results in P4 sharing her leadership with staff members having technical knowledge.

P6 also indicates that EMIS challenged her role as principal for more knowledge to provide guidance for how EMIS could be used in the school.

> *I would have to be more familiarized with it to see what else is available for me other than what we have already discussed. From there I can make more decisions as to what I can do and it can help me to be able to help these children (P6, 3:31).*

P6's comment '*I would have to be more familiarized'* indicates that she does not have the knowledge of how EMIS could be used to benefit the school beyond generating report cards. Thus, she feels a lack of awareness of how the features of EMIS could be used in a way that would support the processes and practices of the school. In this sense, her role as leader is challenged by the need for knowledge that would enable her to better manage EMIS in the school. Viewed in this light, EMIS reconstructs her role as principal by challenging her to have more knowledge of the technology.

P1 also indicates that EMIS challenged his role as principal for more technical knowledge in order to make informed decisions.

> *I believe that as an instructional leader, I have to know what is happening with EMIS even though I have my senior persons, my senior mistress/senior master, who will actually deal with it. (P1, 2:31)*

Being a principal is associated with being able to make informed decisions. For P1, not having the confidence to make informed decisions seemed to be unacceptable, thus he has *'to know*'. Being able '*to know*' was necessary to guide his administrators and teachers with

EMIS. This meant that in order to continue in his role as leader it seems necessary for him to gain technical knowledge of EMIS. In this sense, the role as leader changes such that he has to obtain more technical knowledge about how to guide the staff to support EMIS.

The findings of this study support the arguments of researchers with regards to the importance of technical knowledge needed for EMIS (Cassidy, 2005; Powell, 2006). It also supports the findings of Seneca (2008) with regards to principals having an interest in training in order to make the technology relevant and meaningful to the needs of the school. Although this study's findings indicate that whilst the lack of technical knowledge did not prevent the use of EMIS, it was needed as a support for leaders to increase their confidence and decision making, and for the further implementation of the technology. This need for more technical knowledge impacted their role as leaders, and principals handled this impact by relying on the skills of staff members or training sessions provided by the project team. Thus, in order to facilitate EMIS, principals found themselves having to rely more on the support of stakeholders.

Impact associated with school performance

The role as principal is associated with school performance and the schools' use of EMIS. The findings revealed that the principal's role was challenged to include how the school performed with EMIS. Four of the six principals gave this indication.

For P3, the school's use of EMIS was an area of concern associated with how she felt in her role as leader.

> *I feel in EMIS we could have been doing more at this school. . . We are still a little bit back (P3, 1:37).*

P3 developed expectations of how EMIS should be set up in her school based on previous experience at her former school. As comparisons were made between the two schools' use of EMIS she became compelled to do more with the technology. In this sense, P3's responsibility as principal was associated with how she expected the school to perform with EMIS, and thus, her role as principal was challenged to include the level at which the school performed with the technology.

The impact of EMIS upon principals' role is accepted by principals despite the challenges that emerge. Such is the case with P5 who experienced several challenges, some of which included a server crash, bandwidth upgrade and server relocation. Regardless of the various challenges, she indicated that the technology had not hindered her leadership of the school (P5, 4:31). The findings of the impact of EMIS on principals' role support the argument of researchers that link principals' technology leadership to school performance (Stuart et al., 2009; Makhanu, 2010). Whilst Makhanu (2010) links principals' technology leadership to student performance, this study links it to the changing role of principals. Such changes seem to be unintended consequence of supporting the implementation of EMIS. Thus, senior management's well intended attempt to improve schools with EMIS serves to facilitate changes to the leadership that it relied on to bring about those changes.

EMIS as foreign impact

Principals indicated that EMIS was regarded as a foreign impact that overlooked the expertise of Bahamians. Although only two principals gave this indication, their understandings are noted since it enables insight into the cultural context in which EMIS is implemented.

Recognizing that EMIS was not created in The Bahamas, P2 took opposition and in doing so characterized the technology as being foreign (P2, 1:34). Although principals supported

EMIS, P2 seems to be in opposition to the technology since it was contracted from a vendor outside The Bahamas. For him, using a vendor from outside The Bahamas was perceived it to be a foreign intrusion that overlooked the expertise of local Bahamians. The foreign presence was considered to be unfair to the local expertise.

Unlike P2 who opposed the foreign aspect of EMIS, P4 willingly reconstructed her view as principal in order to facilitate her leadership of the technology.

> *We can't look at this [EMIS] as though it is just The Bahamas. We have to look at this from a global perspective (P4, 1:25).*

For P4, leading the implementation of EMIS requires a global perspective. This perspective involves looking beyond the local geographical boundaries of The Bahamas. According to her, having a global perspective with EMIS was needed to provide leadership with the technology. Thus, she willingly adjusts her understandings as a principal and accepts the foreign impact as the direction in which the education system progresses. Thus, she expands her perspective as principal beyond the local school and country to a more global perspective. In this sense, the foreign impact associated with EMIS requires her to expand her perspective globally when leading the technology in the school and follow the progression of the education system. Such expansion involved changing the principal's role towards a global view and helping to facilitate the way in which the educational technology is progressing towards a global perspective.

The perspectives of P4 and P2 seem to indicate that a cultural sensitivity exists with the design of EMIS which is not separated from leadership roles. This finding supports the arguments of Bahamian researchers with regards to the 'Bahamianization' of the education system (Demissie, 2011; Walkine, 2009). Although these researchers focus their arguments

on classroom practices, this study points to principals' role as leaders. Whilst researchers speak to the involvement of foreign technology in education with regards to aid (Voigts, 1999; Chitolie-Joseph, 2011), principals in this study indicate the presence of foreign technology with regards to leadership roles.

6.2.2 Implementing EMIS impacts principals' stakeholder interactions

Generally there is a high degree of sensitivity to the involvement of stakeholders in EMIS, but at the same time principals are aware of the need to obtain success with the technology. The results of the data analysis reveal that the implementation of EMIS impacts principals' interactions with stakeholders. Principals' understandings of the impacts of EMIS on their interactions with stakeholders emerge through notions of "we", "they" and "I". As principals reflected on their experiences, these words were indicative of the interconnection between EMIS and their interactions with stakeholders.

To facilitate understanding of principals' interactions with stakeholders, the stakeholders are organized based on their location to the school, their involvement with EMIS and principals' interactions. Detailed organization of the stakeholders is presented in Appendix - K.

Group - A stakeholders

Group - A stakeholders are the key decision-makers with EMIS. The group members include the project team leader, MIS and DoE policy makers. Their decisions became justification for the allocation of resources and initiation of the changes needed to facilitate EMIS in the schools. Four of the six principals commented on their experience with Group - A stakeholders. Although the findings did not reveal any direct interaction between principals and Group - A stakeholders, principals' comments on Group - A stakeholders provides an

understanding of how their leadership was impacted. These interactions (or lack of) were found to challenge principals' leadership of the implementation of EMIS.

A key issue for principals was the mismatch between Group - A's expectations for EMIS and actual implementation of EMIS in which the influence of contextual factors was significant. Ideal contexts did not always exist for EMIS because the conditions for change were not always present. The resulting dissatisfaction acts as a catalyst for principals to critically reflect on Group - A stakeholders' involvement. The findings in this study showed that EMIS presented different challenges to each principal and addressing the challenges involved relying on the involvement of senior management. Realizing the impact of Group - A's involvement with EMIS, P2 expressed disapproval for the way the technology was implemented.

> *I would like to suggest to the DoE, that it is almost like you pull back and start all over again in terms of educating these persons as to the use and what you want implemented into the schools as it relates to EMIS programme (P2, 4:14).*

P2's response seems to imply that there is a lack of clarity about how EMIS should be used in the school system to benefit students' learning. He desires more clarity from Group - A stakeholders as to how EMIS should be used for the benefits at the school and at the wider education system.

By associating EMIS with student learning, P2 questions how the technology is aligned with student learning, and thus, seem to call for EMIS to be reconstructed to fit within the existing learning practices in the school. P2's suggestions support the arguments for new technology implementation to be realigned to fit within existing organizational processes and to meet the needs of the local culture (Guo, 2003; Shields, 2011). Such adjustment signifies a two way

change where the technology is adjusted to the local environment and the local environment adjusts to the technology.

Principals indicated a need for leadership at the senior level for the direction of EMIS. P5 illustrated this point by asking the project team leader,

> *What are you guys going to do to take EMIS to the other level (P5, 5:12)?*

P5's question seems to be a call for leadership to direct the future use of EMIS. The lack of commitment from Group - A stakeholders challenged principals' leadership by limiting how they were able to assimilate their schools' resources to support the needs of EMIS. Thus, without proper leadership from Group - A stakeholders, principals were not able to successfully support EMIS. Even though principals relied on their resourcefulness, this was not enough to make the most of EMIS in their schools.

This study's findings support the argument for the support of senior management for principals to provide technology leadership in the school. As principals spoke about Group - A stakeholders their responses were indirect, it is as though who they spoke about were distant and unaware of the activities taking place in the schools. Typically when principals responded negatively to EMIS, they did so in response to the frustrations associated with addressing technical challenges and as a result of the lack of support from the DoE.

Group - B stakeholders

Group - B stakeholders are the leaders and managers of EMIS in the school, and are selected by principals or appointed based on their institutional role. Members of the group include the project team, selected administrators and staff members. Their activities involve setting up

EMIS, providing local technical support, monitoring to ensure proper use of the technology, and providing training. Five of the six principals described interactions with Group B stakeholders.

The responses of principals indicated that EMIS facilitated interactions with Group - B stakeholders beyond the traditional institutionally defined roles. For principals, EMIS was implemented through the formation of teams or reliance on a 'champion'. This meant that the institutional roles in the school were redefined since principals' traditional interactions were impacted towards shared leadership. P1 indicated that the guidance counsellor's involvement with EMIS facilitated in their participation in the administrative decisions of the school (P1, 2:48). Although being involved with EMIS meant having leadership privileges, it also meant going beyond the traditional role of a counsellor. Principals had to interact with these stakeholders in a way that encouraged their support of EMIS and leadership involvement as these stakeholders took on additional duties with no extra compensation.

P1 speaks of how staff members who were not a part of the administrative decision-making process were included because of their leadership role with EMIS. The interaction she had with these staff members required careful communication since the institutional role shifted through their involvement with EMIS (P1, 3:13). A similar experience was also noted as P3 described her interactions with the teacher prior to going on vacation.

> *What I did was I sat down with [teacher] , I look at him as the IT person even though he is still a teacher, because he knows more than most of them . . . He will work along with [administrator], along with the clerical staff to ensure that everything goes into the system (P3, 3:25, 38).*

EMIS impacted P3's interactions with staff members for a more detailed understanding of how the technology was to be used and each member's contribution. As P3 challenged the

teacher beyond the teaching role to support EMIS the leadership role of the teacher expanded, and so did the traditional interactions of P4 with the teacher.

In some cases, the disruption of institutional roles facilitated reliance on other staff. Such is the case with P4 who relied on the school's secretary (P4, 3:18). P5 is the only principal who commented on adjusting the work load of staff members who took on a leadership role with EMIS (P5, 4:35). The recognition of the adjustments needed to the teacher's work load can be regarded as what Burke et al. (2011) describes as monitoring the coherence of the group when work load increases.

Principals generally favoured shared leadership approaches with EMIS. Initially, they relied on internal stakeholders (i.e. staff expertise) to share leadership with EMIS rather than external stakeholders. One possible explanation for this is that direct hands-on use of computing requires time, expertise, and regular use, but few principals had the time, expertise, and motivation for this. Thus, principals selected key staff members with some of the leadership responsibilities with EMIS. Owen and Demb (2004: 644) refer to this as '*distributing leadership through champions'*.

In situations where no member of staff possessed the technical knowledge, external stakeholders were relied on. P3 was supportive of the idea to assemble a team to lead EMIS. She was keen to distribute leadership among the team with the expectation that this would ensure that EMIS was implemented smoothly. The school's staff use of EMIS was committed to the technology to work beyond the normal working hours. However, since Group - B included both internal and external stakeholders, some principals found sharing leadership with external stakeholders to be a source of conflict (P3, 2:36). For example P3's attempt to

use a project team member together with a group of staff members to provide the data entry and technical support needed for her school resulted in conflicts.

Although Wako (2003) suggests that the culture of schools is such that staff members are willing to work together to facilitate the implementation of projects, principals' understandings indicate that this is not always the case. Perhaps this is due to the bureaucratic structure of the education system in The Bahamas, which imposes channels for authority with EMIS to flow and this was found to be a source of hindrance to the implementation of the technology.

Group - C stakeholders

Group - C stakeholders are the most frequent users of EMIS. Members of the group include selected administrators, the schools' EMIS team, teachers and the project team. Among other stakeholders, Group - C spends the most hours logged into the technology inserting relevant data. The cross case analysis of principals' understandings of EMIS revealed that when using the technology, the support principals gave to Group - C stakeholders impacted the effectiveness of the implementation. Support to these stakeholders was evident in modelling the attitude and by the consideration and guidance given by principals (discussed in sections 3.4.2 and 3.4.5).

P6 shared her experience of opening the school campus around 7am on Saturday mornings to support teachers in completing their work with EMIS (P6, 1:44). By opening the campus, P6 modelled the importance of the implementation and the efforts needed by teachers (Gray, 2011). Thus, teachers were able to access the school's server to complete their tasks in EMIS.

Principals' support is also noted by the concern given for the work load of Group - C stakeholders. For example, P4 shows support for Group - C stakeholders by the way she led them through changes associated with the initial use of EMIS. Her concern for the impact the technological change made on their working lives made her opt for the incremental approach to change.

> *People are afraid of change. That is just their human nature. They are afraid of the unknown and there are questions that will come up. But the thing is, you have to ease them through it and make them comfortable by reassuring them it is going to be ok (P4, 2:38).*

P4's consideration of the impact of the change process upon her staff and the decision to '*ease them through it and make them comfortable'* indicates her concern for Group - C stakeholders. On the one hand, P4's concern support the arguments of Wilson (2009) who suggests the importance of recognizing change as a transition period where people resist giving up their identity, role or position, and resist the uncertainties associated with change initiatives. P4's change leadership strategy considered the interactions of Group - C stakeholders during the transitional process. On the other hand, P4's support for her teachers brings to question Wilson's (2009) argument with regards to resistance to giving up their role in response to change. Although P4 does not give up her role as leader, she willingly alters her interactions with these stakeholders to support their use of the technology.

The support principals provide to Group - C stakeholders was also noted through showing empathy. P6 empathized with teachers as a result of the frustrations they faced when working with EMIS (P6, 3:37). P3's empathy for Group - C stakeholders resulted in collaboration with her administrative staff to adjust how new students were entered into EMIS (P3, 3:30). The

collaborative effort enabled the registration process to flow smoothly and supported Group - C stakeholders' use of the technology.

Group - D stakeholders

Group - D stakeholders include those who contact the school or principal to receive information such as school performance data, students' reports or grade statistics. Members of the group include students, parents, DoE officials, other schools and government offices. Four of the six principals commented on interactions with Group - D stakeholders.

The findings reveal that principals' interactions with Group - D stakeholders revolve around instances of accountability in providing relevant information. Two of the four principals indicated that the school's ability to provide information to Group - D stakeholders from EMIS links the school to the positive image associated with EMIS.

Prior to EMIS, retrieving student information requested by Group - D stakeholders required administrators to access the school attendance register[44]. However, with EMIS, access to the same information was gained by logging into the technology. P4 indicates that accessing student information from EMIS is connected with the image associated with EMIS. For her, just having EMIS was desirable since it was believed to improve the image of the school.

> *What we are doing here a lot of other government schools are not doing. So it has placed us on the map as having technology and lined us up with the private schools. One parent who has a child in the private school was saying that she could stay at home and see her child's reports. I said to her you can do that with a child at this school. Her*

[44] The school attendance register is a manual historical record of all students, past and present, who have attended the school. The contents of the register record the name, registration number and demographic information of all students attending the school.

response was, 'that school'. I said, yes we can do that too (P4, 5:19).

P4's interaction with the parent reveals the competitive culture between public and private schooling in The Bahamas (discussed in section 2.5). In general, private schooling is perceived as being a better form of schooling and provides a better learning environment. While interacting with the parent P4 recognised the positive public image associated with having EMIS and seized the opportunity to link the school with that image. The positive image associated with EMIS provided opportunity for her to improve the image of the school. Kling (1996) describes this image as an exciting lure that signifies that the school is worthy of admiration. As P4 spoke directly with the parent, she managed the image of the school by linking it to the positive image associated with EMIS.

Group - E stakeholders

Group - E includes stakeholders who act as sponsors for the school. Members of the group include private sponsors, the PTA and school board. Principals interact with these stakeholders to acquire resources for the school. Four of the six principals indicated interactions with Group - E stakeholders. The findings reveal that the principals' interactions with Group - E stakeholders are based on a combination of the needs of the school and the principal's perceptions of stakeholders' ability to contribute to these needs.

Principals rely on their ability to secure resources when the needs of the school are perceived and when they interact with Group - E stakeholders to secure those needs. Thus, EMIS mediated principals and their interactions with Group - E stakeholders to be resourceful and foster relationships that facilitate meeting the needs of the school. P4 gives an example of how EMIS mediated interactions with Group - E stakeholders to secure infrastructure.

> *We needed corporate sponsors to have the computers and all this other stuff in place. So we reached out to the corporate sponsors and then you let Ministry know these are some of the needs, not that they can fulfil but they try to a certain extent (P4, 1:31).*

P4's explanation indicates her interactions with Group - E stakeholders to provide the resources for EMIS. Procuring computers for staff members to use EMIS involved coordinating local fundraising activities, recruiting private sponsors and informing the DoE of the school needs. As principals interact with Group - E stakeholders, they attempt to draw on their resources to support the school's use of EMIS. Principals' interactions with Group - E stakeholders supports the arguments of Edwards (2005; 2010) with regards to the 'relational agency' developed by leaders to support their professional practice. Whilst Edwards (2005) links 'relational agency' with the knowledge of other practitioners, principals in this study seem to link it with physical resources of individuals. This means what stakeholders may or may not have becomes more important than the stakeholder themselves. In this sense, the relationship with a stakeholder is pursued based on the principals' perception of the stakeholders' capacity to meet the existing need.

P4 seems to confirm this point by the way she portrays the support of the DoE, that is as a formal process from which she does not expect much support. In this sense, she considers the DoE more for its ability to contribute to the school than for the institutional role.

Some principals took the initiative and were resourceful in acquiring the infrastructure needed to support EMIS through collaborations with Group - E stakeholders. Although this collaboration was helpful, at times it resulted in conflicts with the MIS department. Principals who experienced a successful relationship with the DoE, MIS department and external partners, found a way to build and nurture a favourable relationship with these stakeholders.

Principals realised that their interactions with Group - E stakeholders were essential to maintain and develop the school's infrastructure. For example, the need to eliminate the school's networking challenges and the perceived ability of the School Board to provide the funding motivated P6's interactions with the board's chairman (P6, 2:4).

The findings also indicate that interactions between principals and Group - E stakeholders were important to access the technically skilled individuals with knowledge of how to maintain the server, network and internet. It was important for principals to have access to these stakeholders when technical challenges occurred. The recurring idea was for principals to reach out to Group - E stakeholders and search for the needed resources. This had major implications for the role of principals because as the quantity of interactions increased so did the complexity of those interactions. P5 speaks of the assistance provided by Group - E stakeholders in getting the school infrastructure functioning at a level needed to use EMIS.

> *Our major challenge, we did not have enough internet speed to accommodate all the teachers at the same time on the computer. Although it is online based and the teachers can use it at home but most teachers prefer to use it during their non-teaching at school. We overcame that because Cable Bahamas so graciously upgraded our speed at no cost to us (P5, 1:42).*

From P5's response, it seems evident that the interactions with the Group - E stakeholders were necessary for acquiring the resources needed by the school when using EMIS. In her experiences with these stakeholders, she expressed gratitude; for the project team informing her of the online programme she thanked God; for the gentleman who assisted with the computer lab she commended the DoE; and for the free internet upgrade she was cordial. Her experiences with Group - E stakeholders indicate her gratitude for the support they provided by assisting her in meeting the needs of the school.

6.3 Summary

This chapter provided a cross case analysis of principals' understanding of implementing EMIS. This reveals that principals primarily use EMIS to generate reports, access student data and monitor teachers. The cross case findings also reveal that the principals' understanding of EMIS are associated with conflicts and addressing the conflicts involve making decisions that are at odds with the DoE administrative policy. In order to deal with the conflicts, principals collaborated with stakeholders in support of EMIS.

The findings with regards to the role of principals reveal that EMIS has disrupted the traditional role of principals for technical knowledge in order to provide leadership with the technology and to include how the school performed with the technology. The findings also reveal that the impact of EMIS is regarded as foreign that overlooked the expertise of Bahamians. Thus, EMIS requires a global view when leading the technology in the school. Some principals have shown a welcoming attitude while others have voiced their frustrations.

The findings also reveal that EMIS facilitated principals' interactions with stakeholders in a way that caused reliance upon these stakeholders. Thus, Group - A stakeholders' involvement with EMIS shaped how principals work with the technology. Group - B stakeholders' interactions with principals modified their institutional role toward shared leadership. Group - C stakeholders' interactions with principals impacted upon the working lives of principals for the guidance and modelling needed to use EMIS. Group - D stakeholders' interactions with principals impacted upon the working lives for accountability with school records. Finally, Group - E stakeholders' involvement impacted upon the working lives of principals to assist in meeting the needs of the school.

CHAPTER 7: DISCUSSIONS AND CONCLUSIONS

This chapter concludes this study with a review of the research aims and objectives. It revisits the research questions and the main findings. It then suggests implications of the findings at the levels of senior management and school leaders. This then leads to a discussion on how the findings contribute to knowledge and makes recommendations for future research. It concludes with the researcher's reflection of his journey as a researcher.

7.1 The research aims and objectives

The aim of this research project was to explore EMIS in The Bahamas from the leadership perspective. This aim emerged from concerns developed as an insider. The researcher wanted to investigate assumptions undermining the belief that the management of schools could be improved through the use of new technology. This aim was underpinned by a set of objectives that would facilitate a deeper understanding of EMIS from the view of school leaders who had first-hand involvement with the technology.

The reviewed literature on EMIS in developing countries suggested the need for a leadership focus on EMIS, and empirical research in this area would add to the body of knowledge about EMIS. In addition, literature from The Bahamas, together with theoretical arguments on EMIS in developing countries and the principal as technology leader favoured the qualitative approach. The methodology adopted was the case study approach on leadership perspective of EMIS in The Bahamas and this was built up around six embedded cases of individual principals' understandings. A social constructivist view was adopted and maintained by data collected from the six principals together with document and artefact data. The data were coded and the themes that emerged helped to formulate the discussion and conclusion.

7.2 Revisiting the questions and summary of findings

In this study EMIS and its contribution have been analysed. The overarching research question for this study sought to understand, 'What are school leaders' understanding of the implementation and contributions of EMIS in The Bahamas?' This question was answered through the following sub-questions.

7.2.1 What are the principals' of understanding of implementing EMIS in their school?

This question was answered in Chapter 5 by describing each principal's leadership, then examining each principal's understanding of EMIS. Also, in Chapter 6 principals' responses contributed to answering the question by examining a cross case analysis of principals' view of the primary uses of EMIS and the impact of EMIS on their role as leader. Data were collected from interviews with the principals themselves, document review from principals themselves and the DoE, and artefacts collected from the school. Most of the six principal's understanding of EMIS were regarded as positive, although the technology was embedded in conflicts and challenged their leadership of the school. All of the principals associated EMIS with the administrative functions of the school, technical infrastructure and distributed leadership through teams or a selected individual. Although most of the principals' understanding reflected a vision for EMIS, none of the principals made their vision for EMIS explicit. Only two connected their vision of the technology to the goals of the school.

In Chapter 6, the cross case analysis of the embedded case revealed that principals' understanding of EMIS regarded the technology as an imposition on their role as leader. This imposition was associated with the technical knowledge needed to operate EMIS, how the school performed with EMIS and the foreign origin of the technology that overlooked the

expertise of The Bahamians. Also principals' understanding of EMIS revealed the technology impacted on their relationship with stakeholders. Principals' interactions with Group - A stakeholders shaped the 'top-down' flow of leadership with EMIS. Group - B stakeholders modified principals' institutional roles towards shared leadership. Group - C stakeholders required principals to provide guidance and present an exemplary role to support staff use of the technology. Group - D stakeholders required principals to be more accountable with school records. Finally, Group - E stakeholders required principals to be more resourceful in developing relations to meet the needs of the school that emerged for implementing EMIS.

7.2.2 What are the principals' views of the contributions of EMIS to the school?

This question was answered in Chapter 5 for each principal, drawing on data from interviews and document reviews. Also, Chapter 6 contains a cross case analysis of principals' understanding of the primary uses of EMIS.

In Chapter 5, all six principal recognised some contribution of the technology to the administrative functions of the school. The speed and convenience of EMIS contributed to a more efficient and effective handling of student records. Two of the six principals recognised the contribution of EMIS to the instructional programme. These principals noted that the data produced by EMIS assisted in planning the school's next academic year.

In Chapter 6, the cross case analysis of the embedded cases revealed that the primary contribution of EMIS was to generate report cards. Using EMIS to generate report cards reduced the workload of teachers by requiring less writing, reducing the number of calculations teachers had to make, and providing quick access to student data. In addition, calculations performed in EMIS were more accurate when students' grades were recorded. The cross case analysis of principals' understanding also revealed that EMIS contributed to

school management by assisting with the handling of school records and providing information for planning and decision-making. In addition, principals' understanding revealed that EMIS contributed to administrators' monitoring teachers work processes and students' academic performance.

The cross case analysis also revealed that principals' understanding of EMIS contribution is associated with conflicts that challenged the availability of school resources, and affected principals' autonomy. Conflicts are associated with functionality of the infrastructure, and commitment of senior management. Functionality conflicts involve the usefulness of the technical infrastructure which was presumed to be set up in the school prior to the installation of EMIS and operating at a level to accommodate the technology. The inadequate functionality of the technical infrastructure challenged the contributions of EMIS and undermined principals' leadership.

Commitment conflicts are associated with senior management's involvement with EMIS. An underlying expectation existed where principals looked to the DoE to provide the resources needed to enable success with EMIS. The lack of resources challenged the principals' leadership of EMIS, and thus, principals had to become more resourceful to support EMIS.

7.3 Implications of the findings

Throughout the thesis a practitioner stance is taken rather than a policy stance. However, there are policy implications that arise from the practitioner focus. The implications are grouped into two main areas: in terms of the DoE level, which includes senior management, DoE officials and policy makers; and the school level, which includes principals, school administrators and leaders.

7.3.1 Senior management

Senior management plays a significant role for the expectations that are constructed of EMIS in the education system. Senior management's involvement, or lack thereof, has a critical bearing on the interests and recommendations of those in power. The findings in this research show that to promote EMIS senior management should:

Clarify expectations with EMIS

Have clear expectations with EMIS at the national level and how it will benefit the education system. This implies that there should be a shared vision of the benefits that are expected from EMIS at the school, district and national level. The successful implementation of EMIS will hinder expectations if a common understanding of the technology does not exist across departments.

Assess school context individually

Thoroughly assess the needs of each school context in which EMIS is expected to operate. This involves more than merely reviewing the technical infrastructure; it also involves considering if and how the technology might influence the staffing requirements, school processes and national educational practices.

Allow leaders flexibility

Understand that implementing EMIS involves conflicts that may disrupt the normal processes in schools, increase pressure on routine administrative tasks, and increase work responsibilities. Thus, it is important for senior managers to provide principals with the flexibility to enable them to resolve conflicts in support of the implementation process.

Consider the autonomy given to principals with EMIS. Implementing the technology increases principals' interactions with stakeholders and increases the need for additional resources. Allocating more autonomy to principals will allow them to be more resourceful in meeting the needs of their school. Principals may need to build relationships with individuals beyond those traditionally defined in order to support EMIS.

Provide appropriate training

The findings indicate that there is a need for training so that decision-makers become aware of the range of uses and possible benefits of EMIS. New technology requires new knowledge. Thus, steps should be taken to ensure that school leaders are provided with appropriate training on how to operate EMIS and how to align the technology into the existing practices.

Adopt a supportive approach

Although there are indications that the injection of infrastructure into the schools is important, schools must be supported so that the infrastructure operates continually according to demand. This means that investments have to be made to the education system in a way that allows schools to access the resources needed to maintain the technological development. This could take place in the form of investments in human resource or in the form of partnerships.

Be cautions with new technology

Take caution with the introduction of foreign technology as it might not suit local contexts. The global pressures for up-to-date, often western modes of technology have become a common trend.

7.3.2 Leaders in the school

The research has demonstrated that implementing EMIS cannot be separated from the school leadership in context. The findings indicated a strong link between leadership and the implementation of EMIS in schools.

Be prepared to address conflicts

It is important for principals to be prepared to address conflicts associated with EMIS as these may emerge in areas least expected. The processes/practices associated with EMIS and organizational processes/practices do not always align with each other. Implementing EMIS will cause leaders to revisit traditional organizational processes/practices. This means that the degree to which leaders are able to experience success with EMIS is directly associated with leading staff into the development of new practices.

Recognise personal perspectives

To effectively implement EMIS, principals must be aware and appreciate how their personal perspectives impact upon the process. This means recognizing personal views of EMIS and how these support/hinder the implementation. Principals should have a positive view of EMIS since their view of the technology impacts staff's positive participation. Also, principals should recognise and be prepared to reflect an attitude conducive for change since their attitudes are critical factors in ensuring the cohesion needed for staff activity with the technology.

Share leadership responsibilities

Since implementing EMIS is a collaborative process, leadership responsibilities should be shared. The committed efforts of one principal are not sufficient to manage technology in the schools and the other organizational functions. Principals need to collaborate with staff to

form effective teams and distribute leadership responsibilities rather than have direct control over the work processes.

Encourage stakeholder participation

Encouraging stakeholders' participation is important since it is their support that is needed for success with EMIS. This may involve communicating how and where their participation would contribute to success with the technology and developing a shared leadership where each stakeholder recognizes their part in the process.

Prioritize the management of school records

Make the management of records a priority since it is important for achieving effective and efficient administrative functions. The importance of handling records for its contribution to success with EMIS is crucial. The quality of records before and after EMIS suggests that little attention is placed on the quality of data recorded in the schools. Implementing EMIS requires clearly defined record handling processes with the honesty and commitment of all staff members.

7.4 Contribution to knowledge

Much has been written about EMIS in general. However, research into the leadership perspective with EMIS is not common, and thus this research adds to the body of knowledge in this area. Much of the literature on EMIS is linked to the policy or national levels, which undermine important aspects with the technology that are embedded in leadership contexts; these include implementation conflicts, resourcefulness of leaders and the impacts upon organizational roles. The social constructivist approach adopted adds insights into the discussion and interpretation of EMIS as seen through the leadership lens that other studies

might not reveal. In its most basic application, the social constructivist approach enabled a framework upon which decision-makers can consider different points of view with EMIS.

As noted, previous studies on EMIS have adopted a broad policy focus. Thus they have investigated EMIS with little attention to the formal school, thereby decontextualising the technology. This research shows new ways of understanding that EMIS is subjected to leadership. Thus any complete study of EMIS should account for the leadership in context. Linking the resourcefulness of principals to overcoming the challenges associated with EMIS in regards to the availability of infrastructure and technical support is unique to this study.

This study differentiates itself from others in terms of its focus on the understandings of six leaders. In doing so there is a more contextualized account of how principals' understanding of EMIS, principals' interaction with stakeholders and the roles of leaders support/hinder the technology in context. This study was able to show the linkage between principals' understanding and the implementation of EMIS. By looking from the experiences of principals on the implementation of EMIS in their school, this study addresses a crucial gap in the literature on EMIS.

This research contributes to literature around technology leadership with an in-depth analysis into how EMIS was implemented by principals. This study has investigated six principals who had different strategies for how their staff used EMIS and views for the contributions of the technology to the school. As empirical studies with such a focus were not previously available, this study serves to impact the field in several ways. As the first substantial piece of research in what is a relatively new area of education management, it raises awareness of different issues with EMIS at the school level. This research has indicated that principals needed a collaborative form of leadership to encourage an environment that facilitates

success with EMIS. The exchange of knowledge between stakeholders and the different interactions may assist in developing new ways of understanding EMIS.

Whilst the handling of records feature of EMIS is consistent with the literature and research, this study notes that developments in the technology being used as a monitoring mechanism provide additional dimensions. Since supervising staff in the record keeping practices of the school is a part of the leadership responsibility, there comes a time when checks are needed to take place. Tying this into the administrative practices may appear to be common leadership tasks, but the small amount of literature available relating to this aspect of EMIS make this research a valuable addition to the body of knowledge.

Moreover, this study offers pertinent information concerning the reasons why EMIS was not utilized, i.e. lack of support from senior levels, challenges addressing conflicts and lack of policy supporting levels of usage. Such information can be useful to improve the success with EMIS in other organizations.

7.5 Further research

With the increasing implementation of EMIS in countries around the world, a need for empirical research exists in many areas. This thesis has investigated EMIS from the leadership perspective by questioning six principals. There are several areas where further research would be valuable.

1. This study has relied on the experiences of principals and does not take into account the experiences of vice principals, senior level leaders at the DoE, teachers, students and parents. These should be considered as key perspectives in subsequent research since it is their support that is needed for implementing EMIS.

2. This study has suggested that senior management initiated EMIS and that this contributed to the expectations with the technology. Numerous government initiatives tend to be introduced into schools with little regard for the leadership implications in context. Further research is needed to understand the expectations of government initiated EMIS in regards to the working lives of leaders.

3. Most EMIS projects tend to be funded by international and donor agencies. Further research is needed on the cost effectiveness of EMIS. Such research would provide insight to financial benefits of implementing the technology.

4. Further exploration is needed to understand the before and after conditions with EMIS. Research in this area could offer valuable insights into contributions of EMIS to the education system.

7.6 Reflections

This study investigated principals' understanding of EMIS in The Bahamas. Reflecting on the journey, the researcher started with an understanding of technology leadership that was different from perspectives of those leading the technology in the local context. The initial assumptions of the researcher were rooted in experiences working with senior management. In the process of this study he came to appreciate the efforts of staff working in schools.

Reflecting on the research process that started over three years ago, the researcher feels satisfied with the research topic selected and the approach used. As indicated in Chapter 1, this research was chosen because of prior professional experience working with EMIS and the passion the researcher developed over the years. There is a sense of satisfaction that comes when fulfilling the desire to understand more about leaders' experiences with EMIS

and the impact it has on our working lives. It is also satisfying that the research questions were addressed from the perspective of principals who were at the forefront, leading and managing EMIS.As a past member of the project team, the researcher feels partly responsible for the limited use of EMIS: this is more evident after conducting this study. The results revealed to the researcher that neither management at the DoE or at schools have addressed what is required to facilitate the successful use of EMIS in the education system. The findings reveal that a wide range of factors contribute to success with EMIS; some of which include: leadership, management, cultural, social and organizational factors. The researcher has learned that using EMIS is not an easy or straightforward as initially assumed.

Conducting this case study has resulted in the researcher revisiting some of his beliefs. In this sense, the study has expanded the researcher's understanding, and in doing so, moved the researcher away from personal assumptions about technology leadership in the schools. One assumption involves the need for new knowledge. Implementing EMIS requires new knowledge that understands the features of the technology and it can be used in the organization.

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APPENDIX-A DoE Memorandum

MEMORANDUM DEPARTMENT OF EDUCATION

Your reference:

To: All District Superintendents & Principals of All Government Schools

Our reference:

Date: 24 April 2008

RE: STI EDUCATION DATA MANAGEMENT SOLUTIONS

You are aware that the STI Administrative Software is being piloted in the government schools in New Providence and Grand Bahama with a view to extending the system to other schools during the upcoming school year.

In order to ensure the pilot's success, the Department has assigned an STI Training Team to coordinate the training and implementation activities required to move the program forward.

We are pleased to note that as a result of the efforts of the team and the relevant school personnel, the pilot schools have been able to input the demographic data for students, utilize the mark book and the attendance components of the software and produce computer generated report cards for the 2007 Christmas term. It is also anticipated that after the 2008 April training on Scheduling, the pilot schools will have the capabilities for generating student, teacher and master timetables.

The STI Solution is expected to enhance the workplace, increase productivity and minimize the workload of Administrators in the areas of data collection and analysis (scheduling, reporting, documentation). It is also anticipated that the software will provide a wealth of readily accessible information to inform and impact the instructional program. The Department is therefore encouraging all Administrators to give their full support to this initiative.

To this end, we are requesting that each school identify a member of the administrative staff who will be responsible for leading its STI Technology initiative.

Your usual cooperation is expected.

Lionel K. Sands (Mr.)
Acting Director of Education

LS/cag

APPENDIX-B Example of School Computer Labs

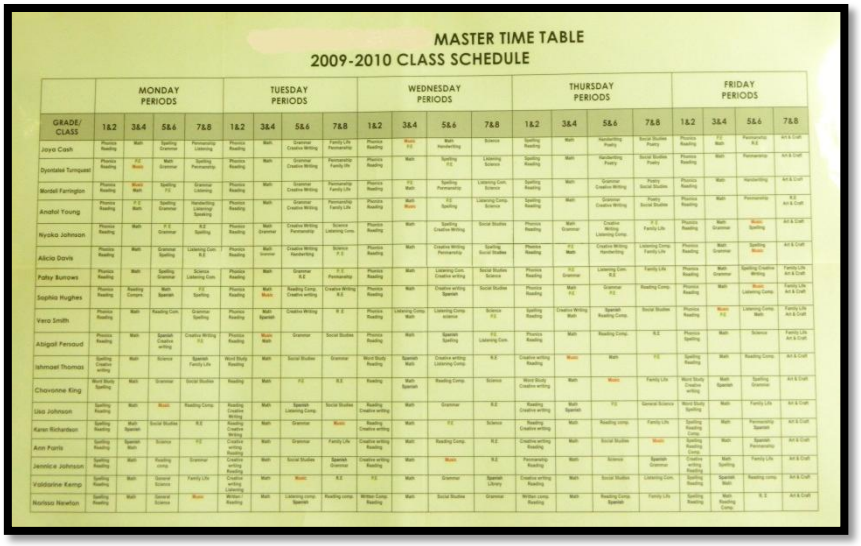
APPENDIX-C Servers and Network Connections

Network Servers in the Schools

Network Connections in the Schools

APPENDIX-D School Attendance Registers Cabinet

APPENDIX-E School Master Timetables



MASTER TIME TABLE
2009-2010 CLASS SCHEDULE

	MONDAY PERIODS				TUESDAY PERIODS				WEDNESDAY PERIODS				THURSDAY PERIODS				FRIDAY PERIODS			
GRADE/ CLASS	1&2	3&4	5&6	7&8	1&2	3&4	5&6	7&8	1&2	3&4	5&6	7&8	1&2	3&4	5&6	7&8	1&2	3&4	5&6	7&8
Joya Cash	Phonics Reading	Math	Spelling Grammar	Penmanship Listening	Phonics Reading	Math	Grammar Creative Writing	Family Life Penmanship	Phonics Reading	Music P.E	Math Handwriting	Science	Spelling Reading	Math	Handwriting Poetry	Social Studies Poetry	Phonics Reading	P.E Math	Penmanship K.E	Art & Craft
Dyontaie Turquest	Phonics Reading	P.E Music	Math Grammar	Spelling Penmanship	Phonics Reading	Math	Grammar Creative Writing	Penmanship Family Life	Phonics Reading	Math	Spelling P.E	Listening Science	Spelling Reading	Math	Handwriting Poetry	Social Studies Poetry	Phonics Reading	Math	Penmanship	Art & Craft
Mardell Farrington	Phonics Reading	Music Math	Spelling P.E	Grammar Listening	Phonics Reading	Math	Grammar Creative Writing	Penmanship Family Life	Phonics Reading	P.E Math	Spelling Penmanship	Listening Com. Science	Spelling Reading	Math	Grammar Creative Writing	Poetry Social Studies	Phonics Reading	Math	Handwriting	Art & Craft
Anahd Young	Phonics Reading	P.E Math	Spelling Grammar	Handwriting Listening Speaking	Phonics Reading	Math	Grammar Creative Writing	Penmanship Family Life	Phonics Reading	Math Music	P.E Spelling	Listening Comp. Science	Spelling Reading	Math	Grammar Creative Writing	Poetry Social Studies	Phonics Reading	Math	Penmanship	K.E Art & Craft
Nyoka Johnson	Phonics Reading	Math	P.E Grammar	K.E Spelling	Phonics Reading	Math Grammar	Creative Writing Penmanship	Science Listening Comp.	Phonics Reading	Math	Spelling Creative Writing	Social Studies	Phonics Reading	Math Grammar	Creative Writing Listening Comp.	P.E Family Life	Phonics Reading	Math Grammar	Music Spelling	Art & Craft
Alicia Davis	Phonics Reading	Math	Grammar Spelling	Listening Com K.E	Phonics Reading	Math Grammar	Creative Writing Handwriting	Science P.E	Phonics Reading	Math	Creative Writing Penmanship	Spelling Social Studies	Phonics Reading	P.E Math	Creative Writing Handwriting	Listening Comp. Family Life	Phonics Reading	Math Grammar	Spelling Music	Art & Craft
Patsy Burrows	Phonics Reading	Math	Spelling Grammar	Science Listening Com.	Phonics Reading	Math	Grammar K.E	P.E Penmanship	Phonics Reading	Math	Listening Com. Creative writing	Social Studies Science	Phonics Reading	P.E Grammar	Listening Com. K.E	Family Life	Phonics Reading	Math Grammar	Spelling Creative Writing	Family Life Art & Craft
Sophia Hughes	Phonics Reading	Reading Comprn	Math Spanish	P.E Spelling	Phonics Reading	Math Music	Reading Comp. Creative writing	Creative Writing K.E	Phonics Reading	Math	Creative writing Spanish	Social Studies	Phonics Reading	Math P.E	Grammar P.E	Reading Comp.	Phonics Reading	Math	Music Listening Comp.	Family Life Art & Craft
Vera Smith	Phonics Reading	Math	Reading Com.	Grammar Spelling	Phonics Reading	Math Spanish	Creative Writing	P. E	Phonics Reading	Listening Comp. Math	Listening Comp. science	Science P.E	Spelling Reading	Creative Writing Math	Spanish Reading Comp.	Social Studies	Phonics Reading	Music P.E	Listening Comp. Math	Family Life Art & Craft
Abigail Fenaud	Phonics Reading	Math	Spanish Creative writing	Creative Writing P.E	Phonics Reading	Music Math	Grammar	Social Studies	Phonics Reading	Math	Spanish Spelling	P.E Listening Com.	Phonics Reading	Math	Reading Comp.	K.E	Phonics Spelling	Math	Science	Family Life Art & Craft
Ishmael Thomas	Spelling Creative writing	Math	Science	Spanish Family Life	Word Study Reading	Math	Social Studies	Grammar	Word Study Reading	Spanish Math	Creative writing Listening Comp.	K.E	Creative writing Reading	Music	Math	P.E	Spelling Reading	Math	Reading Comp.	Art & Craft
Chavonne King	Word Study Spelling	Math	Grammar	Social Studies	Reading	Math	P.E	K.E	Reading	Math Spanish	Reading Comp.	Science	Word Study Creative writing	Math	Music	Family Life	Word Study Creative writing	Math Spanish	Spelling Grammar	Art & Craft
Lisa Johnson	Spelling Reading	Math	Music	Reading Comp.	Reading Creative Writing	Math	Spanish Listening Comp.	Social Studies	Reading Creative writing	Math	Grammar	K.E	Reading Creative writing	Math Spanish	P.E	General Science	Word Study Spelling	Math	Family Life	Art & Craft
Keon Richardson	Spelling Reading	Math Spanish	Social Studies	K.E	Reading Creative Writing	Math	Grammar	Music	Reading Creative writing	Math	P.E	Science	Reading Creative writing	Math	Reading comp.	Family Life	Spelling Reading Comp.	Math	Penmanship Spanish	Art & Craft
Ann Parris	Spelling Reading	Spanish Math	Science	P.E	Reading Creative writing Reading	Math	Grammar	Family Life	Creative writing Reading	Math	Reading Comp.	K.E	Creative writing Reading	Math	Social Studies	Music	Spelling Reading Comp.	Math	Spanish Penmanship	Art & Craft
Jennica Johnson	Spelling Reading	Math	Reading comp.	Grammar	Creative writing Reading	Math	Social Studies	Spanish Grammar	Creative writing Reading	Math	Music	K.E	Penmanship Reading	Math	Science	Spanish Grammar	Creative writing Reading	Math Spelling	Family Life	Art & Craft
Valdarine Kemp	Spelling Reading	Math	General Science	Family Life	Creative writing Reading	Math	Music	K.E	P.E	Math	Grammar	Spanish Library	Creative writing Reading	Math	Social Studies	Listening Com.	Spelling Reading	Spanish Math	Reading comp.	Art & Craft
Norissa Newton	Spelling Reading	Math	General Science	Music	Written Reading	Math	Listening comp. Spanish	Reading comp.	Written Comp. Reading	Math	Social Studies	Grammar	Written comp. Reading	Math	Reading Comp. Spanish	Family Life	Spelling Reading	Math Reading Comp.	K.E	Art & Craft

APPENDIX-F University of Sussex Ethics Certificate of Approval

University of Sussex

Social Sciences Cluster-based Research Ethics Committee **CERTIFICATE OF APPROVAL**	
Reference Number:	1011/03/11
School:	ESW
Title of Project	Management perspective on the integration of technology
Principal Investigator:	John Alexander Cash
Name of Supervisor: (for student projects)	Dr Y Sayed
Expected Start Date:*	June 2011

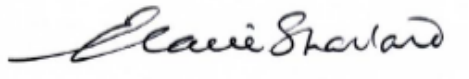
*NB. If the actual project start date is delayed beyond 12 months of the expected start date, this Certificate of Approval will lapse and the project will need to be reviewed again to take account of changed circumstances such as legislation, sponsor requirements and University procedures

This project has been given ethical approval by the Social Sciences Cluster-based Research Ethics Committee (C-REC).

Please note the following requirements for approved submissions:

Amendments to research proposal
Any changes or amendments to the approved proposal, which have ethical implications, must be submitted to the committee for authorisation prior to implementation.

Feedback regarding any adverse and unexpected events
Any adverse (undesirable and unintended) and unexpected events that occur during the implementation of the project must be reported to the Chair of the Social Sciences C-REC. In the event of a serious adverse event, research must be stopped immediately and the Chair alerted within 24 hours of the occurrence.

Authorised Signature	
Name of Authorised Signatory (C-REC Chair or nominated deputy)	Dr Elaine Sharland
Date	12 April 2011

APPENDIX-G DoE Consent

Consent from the Department of Education to conduct the research

DEPARTMENT OF EDUCATION
P.O. BOX N 3913/14 NASSAU, N.P., THE BAHAMAS
Tel.: (242) 502-2700
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EDU/D/

12th May, 2011

Mr. John Cash
P. O. Box N 10081
Nassau, Bahamas

Dear Mr. Cash

I refer to your letter dated 9th May, 2011 requesting permission to conduct a doctoral research project in Management Perspective on the Integration of Technology in the Department of Education.

Kindly note that permission has been granted to conduct your research within the public schools.

Yours sincerely

DEPARTMENT OF EDUCATION
MAY 18 2011
DIRECTOR'S OFFICE
Nassau, Bahamas

Lionel K. Sands
Director of Education

/cj

APPENDIX-H Consent Form

University of Sussex

Title of Project: **MANAGEMENT PERSPECTIVE ON THE INTEGRATION OF TECHNOLOGY**

Chief Researcher: **JOHN CASH**

Study Number: _____

- I confirm that I have read the information consent sheet for the above study. ☐
- I have had the opportunity to ask questions and have had these answered satisfactorily. ☐
- I understand that my participation is voluntary and I am free to withdraw consent at any time, without giving a reason, without my legal rights being affected. ☐
- I agree to being contacted in the future about further studies relating to technology in the school. ☐
- I understand that data collected may be looked at by responsible representatives from the University of Sussex for the purposes of monitoring and auditing to ensure that the study is being conducted properly. I give permission for these individuals to have access to relevant information. ☐
- I understand that data collected will not be used by or transferred to commercial organisations. ☐

_____ _____

Name of participant /donor (Print) Signature of participant / Date

JOHN CASH _____

Name of Chief Researcher (Print) Signature of Chief Researcher / Date

APPENDIX-I Interview Guide

1. Tell me about EMIS.
2. What do you use EMIS for?
3. Who are some of the key persons you worked with to implement EMIS in this school?
4. When you look back at EMIS, can you give examples of working with EMIS?
5. How do you use EMIS?
6. Is there more you feel you can do with EMIS?
7. What would you say EMIS's contribution has been to this school?

APPENDIX-J **School End of Term Report Card**

Ministry of Education

Nassau, NP Bahamas

REPORT CARD
Summer Term

HR:

Absent: Late: Merit: Suspensions:

Subjects	Teacher(s	Term Grade		Exam Grade		Final Grade		Effort	Conduct	Comments
Spanish 11		89	B	90	A	89	B	3	4	A Conscientious Worker Shows Pride In His/Her Work
Mathematics 11		85	B	100	A	91	A	2	3	Deserves Special Commendation Works Inconsistently
English Lang 11		69	C	72	B	70	C	3	3	Work Is Improving Hard Worker
English Lit 11		83	B	82	B	83	B	3	3	Hard Worker
Geography 11		90	A	91	A	90	A			Excellent Student
Comb Sci. 11		87	B	95	A	90	A	4	4	Excellent Student Hard Worker
Biology 11		94	A	95	A	94	A	4	4	Excellent Student Deserves Special Commendation
Marine Science 11		87	B	95	A	90	A	4	4	Has Done Extremely Well Deserves Special Commendation
Physical Ed 11		100	A	82	B	93	A			
Homeroom Comments										
Homeroom Comments										Excellent Student

GPA: 3.56

:

Teacher's Signature:_____ Administrator's Signature:_____

_____
Parent/Guardian Signature

Scale: A=100 to 90 B=89 to 71 C=70 to 56 D=55 to 45 F=44 to 0

Effort / Conduct: 4=Excellent 3=Very Good 2=Satisfactory 1=Below Average 0=Very Good

APPENDIX-K ORGANISIING STAKEHOLDERS

There are many stakeholders who directly and indirectly associated with EMIS in Bahamian schools. The first sorting of stakeholders resulted in two types of stakeholders which include: internal and external. The internal stakeholders are positioned at the local school site and have regular face to face interactions with each other as they conduct their day-to-day responsibilities. Also within the first sorting are external stakeholders who are positioned outside the local school site. Table-6.2 outlines the internal and external stakeholders identified by principals.

TABLE-6.2 INTERNAL AND EXTERNAL STAKEHOLDERS

Internal	External
Principal, administrators, teachers, secretary, clerk, guidance counsellors, students	Project team, MIS, vendor, parents, sponsors, PTA, School Board, colleagues, general public, other schools, government offices

The second sorting of stakeholders was conducted based on the type of participation with EMIS. This assortment enabled additional stakeholders to be identified: primary and secondary. The primary stakeholders have user name and pass word access to log into EMIS and some of these actors are internal, while others are external. The secondary stakeholders include actors without user name and password to log into EMIS; some are internal while others are external. Table-6.3 outlines the primary and secondary stakeholders identified by principals.

TABLE-6.3 PRIMARY AND SECONDARY STAKEHOLDERS

Primary	Principal, administrators, teachers, Project team, school EMIS team, MIS, vendor, parents
Secondary	PTA, School Board, school sponsors, general public, other schools, government offices, students

Table-6.2 sorted stakeholders based on their location to the school (internal and external) and Table-6.3 sorted stakeholders based on their access into EMIS (primary and secondary). Principals' interactions with the internal, external, primary and secondary stakeholders varied. Based on these various interactions, several groups of stakeholders emerge within the internal and external stakeholders; and also within the primary and secondary stakeholders. To facilitate understanding of the impact of EMIS on principals' stakeholder relations, the internal, external, primary and secondary stakeholders are combined in a table then placed into groups based on their interaction with principals. These are outlined in Table-6.4 along with their relevant actors.

TABLE-6.4 PRINCIPAL STAKEHOLDERS GROUPINGS

	INTERNAL	EXTERNAL
PRIMARY	Principal, teachers and school EMIS team (selected staff member/s)	**Group-A** Project team leader, MIS, DoE policy makers **Group-B** Project team, selected administrators and staff members Project team, MIS, vendor, parents and selected personnel with technical expertise **Group-C** Selected administrators, school EMIS team, teachers, project team
SECONDARY	students, security officers, maintenance staff and unselected administrators	**Group-D** Students, parents, DoE officials, other schools, government offices **Group-E** Private sponsors, PTA, School Board, unselected administrators, maintenance staff PTA, School Board, sponsors, general public, other schools and government offices

The various groups presented in Table–6.4 are discussed briefly below. Further discussions of these groups and how principals interact with them are presented in the next section.

- **Group - A** stakeholders are the key decision-makers and planners in senior positions with EMIS. These stakeholders were noted among the primary and external stakeholders. They are influential as their decisions become justification for the initiation of change, for the allocation of resources to facilitate the use of EMIS and for national level leadership in the education system.

- **Group - B** stakeholders are the leaders and administrators of EMIS and are selected by principals or appointed based on their institutional role. Although, these stakeholders are primarily internal, the involvement of external stakeholders tends to be in leadership roles. Group - B stakeholders role involve carrying out the objectives and decisions of the Group - A stakeholders.

- **Group - C** stakeholders are the most frequent users of EMIS and have little leadership influence during EMIS decisions making process. Among the stakeholders, Group - C spend the most hours logged into the technology inserting relevant data; also their frequency of log in is more than other actors using EMIS.

- **Group - D** stakeholders include those who contact the school or principal to receive information such as report data, students' reports or grade statistics out of EMIS. Group - D includes secondary internal and external stakeholders.

- **Group - E** includes stakeholders without access into EMIS. These stakeholders provide the resources and support the school in the use of EMIS.

These groups are analysed in the next section based on their interactions with principals.